NOVEMBER 16, 1953

IN TWO SECTIONS—SECTION ONE

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

COMPLETE IN THIS ISSUE

What's ahead in machining

Where to buy machine tools

SEE SECTION TWO

CONTENTS — PAGE 5

B&W's CROLOY 16-13-3

was born in

1934...

1953

LOOK AT OUR LITTLE GUY NOW

Corrosion-resistant
Oxidation-resistant
Strength at Elevated Temperatures

Back in 1934 B&W successfully produced *seamless* 16 per cent chromium, 13 per cent nickel, 3 per cent molybdenum (B&W CROLOY 16-13-3) . . . and, as a result of continuing research, in 1947 produced the first Type 316 columbium-stabilized chromium-nickel-molybdenum alloy tubing (CROLOY 16-13-3Cb), useful for field welding. Today CROLOY 16-13-3 finds wide use as a corrosion-resisting alloy in the chemical field.

It handles successfully the hot sulphite liquors and bleaches in pulp and paper industries, and resists corrosive action of many mineral and organic acids in rayon manufacture and in textile dyes. CROLOY 16-13-3 resists photographic chemicals and acquits itself splendidly against the pitting type of attack caused by acid solutions containing small amounts of chlorides. It is less susceptible toward pitting in sea water than many other grades of stainless. In fact, where strength at elevated temperatures or extreme corrosion-resistant properties are required, you'll find one of the CROLOY 16-13-3 family on the job.

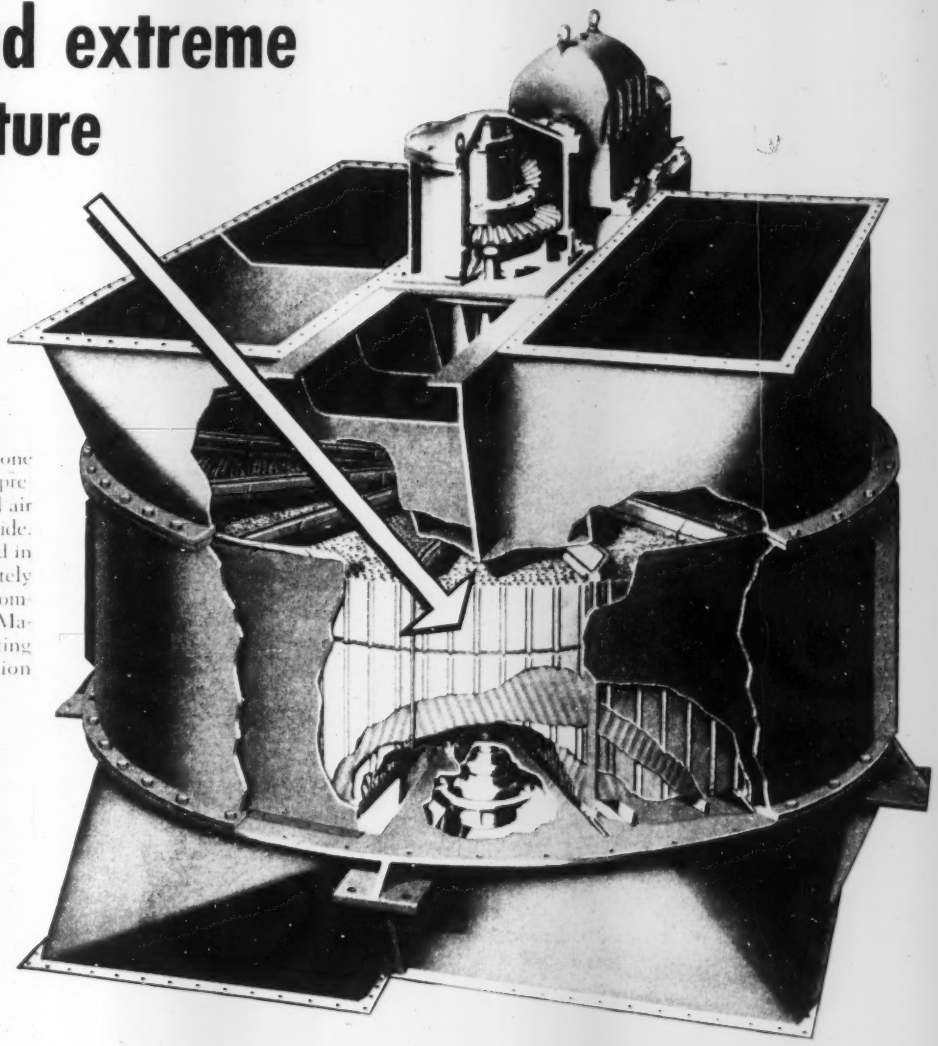
In addition to these two tubing steels, two other modifications of the basic steel have been produced. CROLOY 16-13-3ELC, a low carbon (.03 max.) grade, is especially suitable for field welding and CROLOY 18-13-3, with higher chromium and molybdenum, is particularly resistant to pitting and wedge or contact corrosion in saline solutions.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

B&W STAINLESS and WELDED TUBES

TA-1753 (H)

Heat transfer elements of *Mayari R* withstand extreme temperature swings



Hot flue gas passes through one side of the Ljungstrom preheater, and a stream of cold air passes through the other side. Heating elements, contained in a rotor, are passed alternately through the flue gas and incoming air stream. The use of Mayari R in the cold end heating elements assures protection against corrosion.

Several times a minute each element in the rotor of the Ljungstrom air preheater comes in contact with hot flue gas at temperatures as high as 700 deg, followed by relatively cold air at temperatures as low as 70 deg. These extreme changes in temperature obviously have a tendency to corrode the heat-transfer elements.

The use of corrosion-resistant Mayari R in the cold end heating elements, which are more susceptible to corrosion, permits their operation at low gas exit temperatures without undue cost of replacement due to corrosion. Result: Continuous operation of the preheaters can be maintained with high overall efficiency.

Tests indicate that Mayari R has from 5 to 6 times the atmospheric corrosion resistance of plain carbon steel, and from 2 to 4 times that of copper bearing steel. As for workability, Mayari R can be formed, fabricated and welded by the usual methods, using ordinary shop equipment.

Other problems involving industrial heat have been solved effectively by using Mayari R. For more information about its properties and recommended uses, write for a copy of Catalog 259.

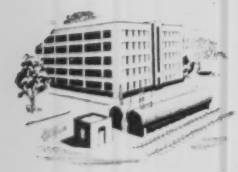
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*

Philgas*



FOR INDUSTRIES

FOR UTILITIES

A Clean-Burning, Uniform LP-Gas!

RELIABILITY: You can depend on Philgas, a top-quality Phillips product, for uniform gravity and high thermal value. Exceptionally clean, too . . . free from harmful contaminants.

EASE OF USE: Automatic Philgas systems assure constant furnace temperatures and atmospheres . . . reduce operational worries . . . cut down on overhead.

RECORD: Philgas is being used successfully by many of the nation's leading manufacturers for almost any operation where a uniform, clean, easily-controlled heat is needed. Many progressive utilities, too, are supplementing their output of natural or manufactured gas with dependable Philgas. It's America's largest selling brand of LP-Gas!

*Philgas is the Phillips Petroleum Company trademark for its high-quality propane-butane LP-Gas or bottled gas

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

PHILLIPS PETROLEUM COMPANY

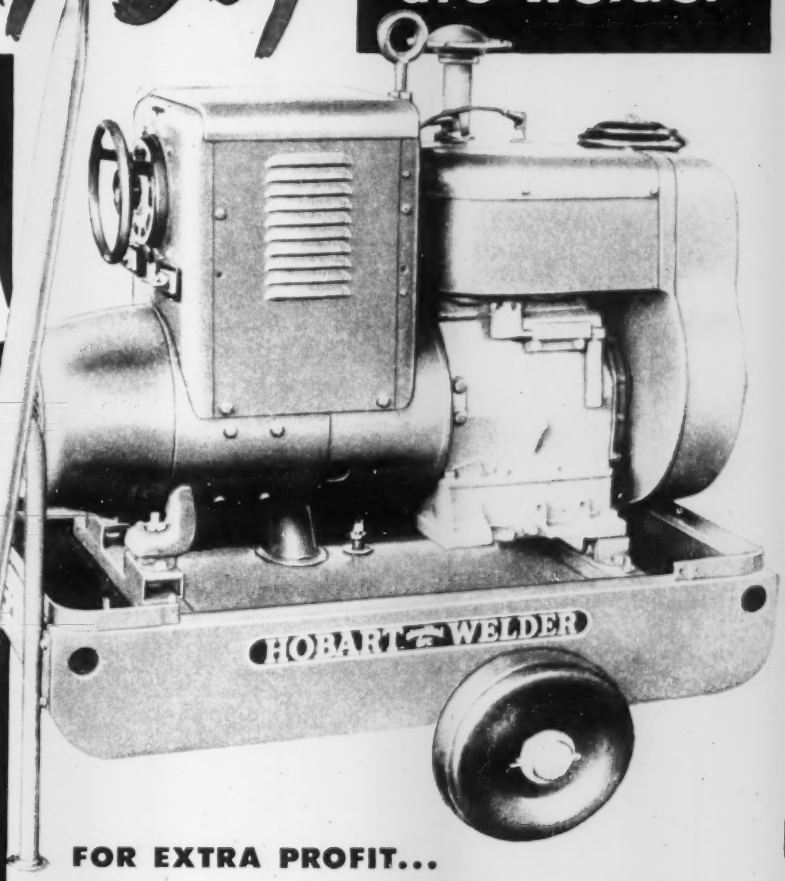
Sales Department • Bartlesville, Oklahoma

Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kans.

"Husky Boy"

air cooled gas drive arc welder

–another great welder value by **HOBART**



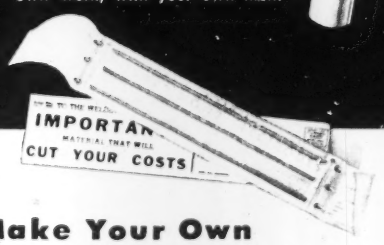
Lightweight and Compact

Easy to Transport

Dependable 200 amp. Performance

Did you get your FREE electrode kit?

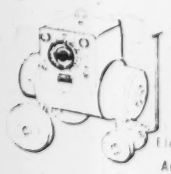
Never before such interest and acceptance in welding electrode performance. If you missed testing this all position, general purpose No. 12 electrode, check the coupon now for FREE samples that you can try in your shop, on your own work, with your own men.

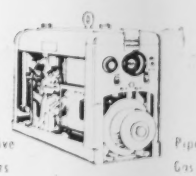


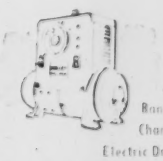
Make Your Own Comparison . . . on this outstanding electrode that will handle 80% of all production work at a greater savings in cost to you. Samples mailed promptly.

FOR EXTRA PROFIT...

Here's a lightweight welder that can be used efficiently in the plant or easily transported for emergency outside repair work—a welder that's independent of outside power source and one that can be moved easily and quickly from place to place. Like all Hobart Welders, you'll find the "Husky Boy" will give you faster, stronger welds more economically—no "skimping" quality and materials for top performance and low operating costs. Check coupon below for complete information on the popular "Husky Boy" arc welder.


Electric Drive Arc Welders


Pipeliner Gas Drive


Bantam Champ Electric Drive

Hobart "One of the world's largest builders of arc welders"
HOBART BROTHERS COMPANY, BOX ST-113, TROY, OHIO

free!

HOBART BROTHERS COMPANY, BOX ST-113, TROY, OHIO

☐ "Welder's Vest Pocket Guide" a valuable guide to better welding methods.

Send complete details on the items checked below.

☐ Hobart "Husky Boy" ☐ Electric Drive Arc Welders ☐ Gas Drive Arc Welders ☐ Electrode Catalog ☐ Accessory Catalog.

☐ Send free sample kit of Hobart No. 12 general-purpose electrodes.

Our work is _____

NAME _____ POSITION _____

FIRM _____

ADDRESS _____

HOBART WELDERS, ELECTRODES

The operator brings the rotating lapping stone into contact with work centers to correct inaccuracies.

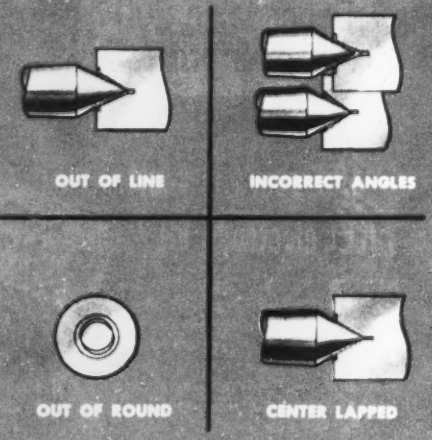
EX-CELL-O

CENTER LAPPING MACHINES

FOR GREATER PRECISION IN SUBSEQUENT MACHINING

Meeting today's precision standards requires careful checking of every phase of the job, *including the center holes in the work*. Ex-Cell-O Center Lapping Machines correct inaccuracies of center holes, thus contributing to greater precision in all subsequent operations performed between centers. These machines are precision built and are easy to operate. The lapping stone is dressed to a 60° angle by a hand operated diamond dresser. An adjustable dresser for other angles also is available. These machines are fully described in Bulletin 40271—a copy is yours for the asking.

Eliminate out-of-line, out-of-round, and incorrect angles by Center Lapping



EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

XLO

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
DAIRY EQUIPMENT • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS

53-44

This Week in Metalworking

STEEL

Vol. 133 No. 20 November 16, 1953

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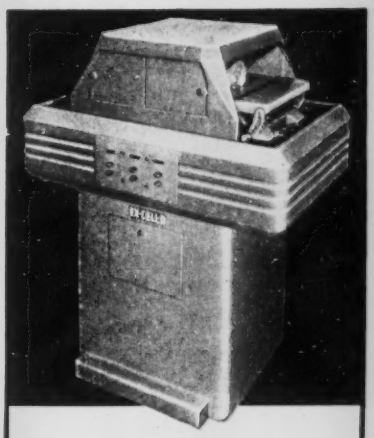
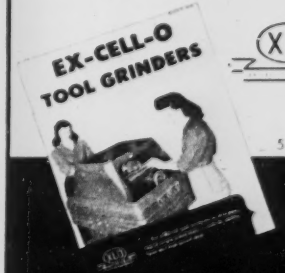


This Sturdy Precision

Tool Grinder

STYLE 44-A, is the newest in a complete line made by Ex-Cell-O for sharpening carbides, high speed steels, and cast alloys. All are double end models, equipped for face grinding on cup type wheels; for efficient and economical conditioning of single-point tools.

BULLETIN 46262, pictured below, shows and describes models for large plants or small shops; also gives important data on tool grinding. Ask Ex-Cell-O to send you a free copy. Write for it today.



For Better Work and Longer Life—

TOOL GRINDERS

BY

EX-CELL-O CORPORATION

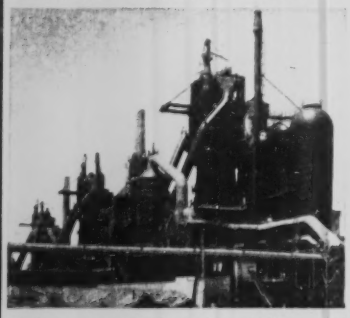
Detroit 32, Michigan

(Advertisement)

what's NEW in Engineering

An automatic welding machine, developed by a Michigan company, is claimed to duplicate the work of dozens of human welders. The octopus-like machine generates temperatures of 2000° F.; is water cooled. One operator can make 62 simultaneous welds with it. In one minute it can perform 744 weld operations.

Reducing coke consumption while increasing pig iron production was the dual problem facing Kaiser Engineers in designing and building blast furnaces for a California steel plant. A courageous new furnace



design gave record results — 1335 tons of pig iron per day on furnaces rated for 1200 tons. These furnaces use 1109 lbs. of coke per net ton of iron against a national average of 1600-1700 lbs. per ton. We'll send you a reprint of an article by Dr. W. C. Rueckel which tells how Kaiser Engineers attained this out-standing furnace practice — with savings in capital and operating costs through increased production.

Simplified Drafting Practice, by Healy and Rau, is a best selling new book which outlines a modern approach to industrial drafting. The method claims to cut drafting time 30-50%; reduce large blueprints to handy pocket size.

For those clients who want general consulting engineering services, such as economic studies, evaluation, investigation of manufacturing facilities, or analysis of operating costs, the full engineering experience of Kaiser Engineers is available. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes

Just Before the Battle

The benzedrine tablets have been passed out, hypodermic syringes complete with adrenalin charges are in readiness, a fresh supply of midnight oil has been put into stock, and editors are bidding sorrowful adieus to their wives and children whom they may not see for weeks and weeks.

You've guessed it! METALWORKING YEARBOOK time is here.

Allen Folks Like STEEL

The October Issue of the *Allen News*, house organ published by the Allen Manufacturing Company of Hartford Conn., was sitting proudly atop our orange crate when we time-clocked into the paper mill this a.m.

A boldly drawn circle of red crayon commanded our attention to an article on page 2 titled "What do you read?"

Here's what it said:

"To guide our advertising department in selecting media for trade magazine advertising, a little survey was made last month to find out what Allen foremen and engineers are currently reading, if they read at all. Surprisingly enough, despite the competition of TV, only one harried soul admitted he had no time for reading. One out of four claimed he actually read more than he did five years ago, while 20 per cent said 'less' and the rest 'about the same.'"

Incidentally, the survey showed that Allen Co.'s engineers most prefer STEEL, *New Equipment Digest*, *Readers Digest* and *Design News*.

Foremen like *Popular Mechanics*, *Saturday Evening Post*, *Colliers*, *Readers Digest* and *Factory*.

What do you read?

Conductor Is a Thing

Do you know what an aluminum conductor is? We have our ideas and so do the folks at Kaiser Aluminum who passed this item along to us. It appears, however, that the secretaries at Kaiser Aluminum & Chemical Sales Inc., Chicago, have a slightly different idea of the product than the Kaisermen who make it. Here for example, is how Kaye Berger describes them:

"Conductor is a thing. It comes in various sizes, shapes and kinds. You can buy it in bunches like celery or singly like cantaloupes. Some people — strictly laymen — think a conductor is a character who collects your money on a streetcar. That's not the kind I'm talking about. I mean the kind which falls from electric light poles during wind storms and electrocutes people who touch it.

"Neither am I talking about the burnt orange colored conductor. That's copper, and copper is a nasty word. What I mean is the silvery, lustrous aluminum kind. You can buy it with a steel middle (core, that is), meaning one wire in the middle is steel instead of aluminum like the other wires, and they are all twisted around and around each other either to the left or to the right. (I never knew electricity cared which way it went, but it does.)

"So-called 'covered' conductor is named this because it has a tube-like rubber sheet around it with the conductor running inside. This helps protect the conductor from the weather and the people. It comes in three plexes and one proof: triplex, duplex, quadruplex and weatherproof."

Industrial Revolution II

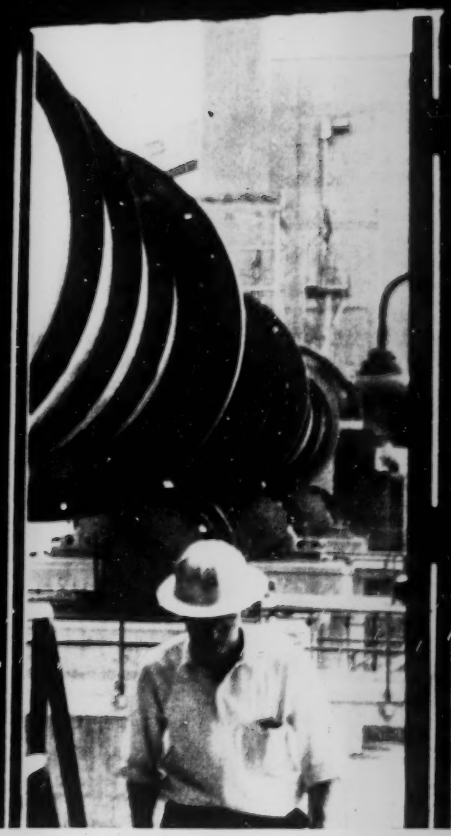
We are told that the "second industrial revolution" is within the life span of most of us reading this column. In fact, the technicians and engineers currently spawning great automatic brains and other fabulous electronic machinery are already taking giant steps into the future.

One person we know and whose judgment we respect went "out on a limb" to tell us that in his opinion, the electronics industry might well replace the automobile industry as the major support of the United States' economy.

Shrdlu

(Metalworking Outlook—Page 61)

NUMBER 1 IN A SERIES OF PHOTOGRAPHS OF THE OHIO WORKS, MAPLE GROVE, OHIO.

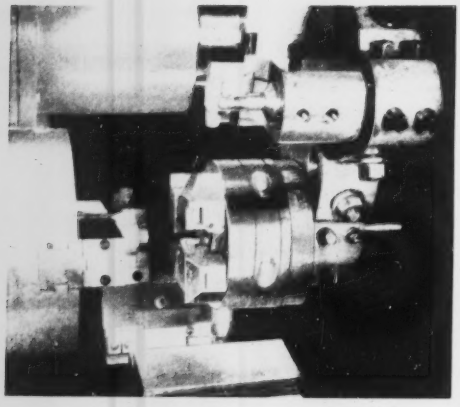


GRANULAR BASIC

REFRACTORIES

It costs no more to buy dead burned dolomite backed by facilities such as these which are used to make Magnefer and Syndolag. This is Kiln #12, seen from the discharge end.

BASIC REFRACTORIES INC. CLEVELAND, OHIO



"AUTOMATIC THREADING" for Automatic Chucking Machines

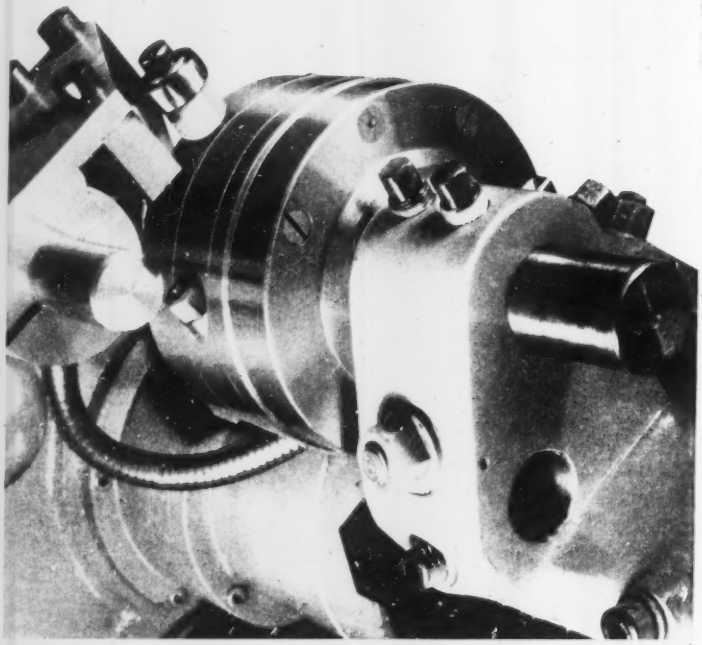
The adaptability of Landis Heads is once again proven by this application of a LANDMATIC Head on a #1AC Warner & Swasey Automatic Chucking Machine. Normally, the LANDMATIC is applied to turret lathes and while self-opening, it is closed manually. To adapt this stationary head for automatic operation on the Automatic Chucking Machine, only two steps were required: (1)—the addition of a closing roller in place of the handle and (2)—the use of special closing pins which provide overtravel, eliminating the need of a complicated, accurately-set closing cam.

This adaptability has paid off for the S&C Electric Company, Chicago, Illinois, manufacturers of high voltage protective equipment.

Besides a completely automatic threading operation, this head, through the use of long life tangential chasers, offers lower tool cost and less down time. For example—when threading the workpiece shown, a contact ferrule of 85-5-5-5 cast red brass requiring a 1 3/8"—16 Pitch UN thread 3/8" long into a 1/16" relief, complete runs of over 3000 pieces are made without grinding the chasers.

Another outstanding feature of LANDMATIC Heat-Treated Heads is their wide range coverage and oversize capacity. The 2" Head, illustrated here, will normally thread all diameters ranging from 3/8" to 2". Using oversize chaser holders, its range can be increased to thread up to 3 3/4" in diameter.

For more complete information on LANDIS Heat-Treated Heads for rotary or stationary applications, straight or tapered threading, ask for Bulletin F-90. Please send specifications when writing.



LANDIS *Machine* CO. 50th ANNIVERSARY WAYNESBORO PENNSYLVANIA

384

Udylite

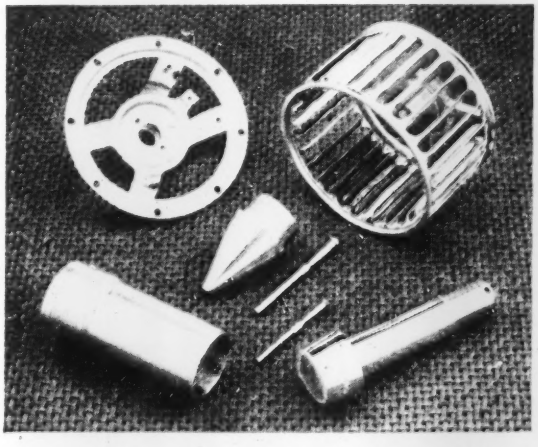
LABORATORY CONTROL MAKES THE DIFFERENCE!

In *cadmium plating*, good results, time after time, are due to tested supplies and ingredients. Quality must never vary. That's where Udylite thoroughness pays off!

"Uniformity through laboratory control" is the keynote of all Udylite supplies. For example, check these materials used with new Udylite BRY-CAD:

- The unvarying purity of Cadmium Ball Anodes — which Udylite originated — is an example of Udylite uniform quality. All anodes are spot-checked to maintain uniformity of size, content and weight.
- Udylite Ball Anode containers are designed to use anodes to the last ounce — as well as maintain maximum anode area.
- Udylite Cadmium Salt #153 contains all basic components of the cadmium bath. You can be sure that the chemicals used are finest quality . . . and mixed in EXACT proportions for best results.
- Udylite Brightener #53 used in the BRY-CAD Process results from years of laboratory research.

Note various items of intricate shape plated with the new Udylite BRY-CAD.

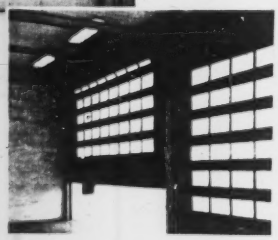


So . . . for best results . . . for uniformity in plating on YOUR jobs . . . choose Udylite anodes, containers, materials. Call your Udylite technical man or write direct for complete lists of supplies. THE UDYLITE CORPORATION DETROIT 11, MICHIGAN. *West of Rockies, L. H. Butcher Co., Los Angeles 23, California.*

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

Kinnear Steel RōL-TOP Doors



Extra "Doorability" of Heavily Galvanized Sections*

Will not sag, warp, rot or split

Built to fit openings of various sizes

Easy space-saving upward action

Opens completely out of the way

Lasting resistance to fire, wind, weather

Heavy-duty torsion spring counterbalance

Provision for any number of glass panels

Easily installed in old or new buildings

WRITE FOR THIS **FREE** RoL-TOP BULLETIN TODAY!

In Kinnear Steel RōL-TOP Doors, you get the efficiency of smooth ball-bearing upward action . . . *plus* all-steel strength and durability . . . *plus* provision for glass panels in one or more door sections, as desired.

*To assure extra service life with minimum maintenance, the rugged steel sections are given a heavy coating of pure zinc (1.75 oz. per square foot of flat metal per ASTM standard) by the hot process. Then Kinnear's Paint Bond (a special phosphate immersion process) is added, to make sure paint will adhere *immediately and thoroughly* to the protective zinc coating.

In every detail, Kinnear Steel RōL-TOP Doors feature extra strength and ruggedness, for long, heavy-duty, low-cost performance. Sizes to fit any opening. Manual, chain, or motor operation. WRITE FOR FULL DETAILS.

KINNEAR ROLLING DOORS
Saving Ways in Doorways

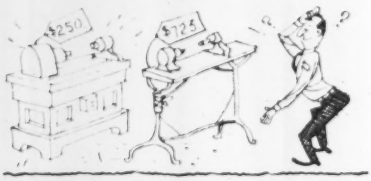
Kinnear Steel RōL-TOP Doors are designed and built by the same door specialists who *originated* the door with the interlocking steel-slat curtain—famous for more than half a century as the Kinnear Steel Rolling Door.

The KINNEAR Manufacturing Co. *Offices and Agents in All Principal Cities*

FACTORIES: 1780-1800 Fields Ave., Columbus 16, O.—1742 Yosemite Ave., San Francisco 24, Calif.

LETTERS TO THE EDITORS

Tax Reform Urged



Your Nov. 2 editorial "This Reform Can't Wait" (p. 35) appealed to me as the kind of horse sense that should be read by the secretary of the treasury. Without asking your permission, I have forwarded the copy received by me to Mr. Overby, an assistant in the Treasury department.

I wonder if your ideas on reform could go a few steps further. Suppose, for example, that the steel industry were to start featuring a "Waste Wisely, Want Better" program that would be the basis for establishing a tax on obsolete products of our industrial plant and equipment.

For example: Suppose that the excise taxes charged by cities and towns throughout the country for automobiles were computed on an inverse ratio of their value. Suppose it would cost more to run a car ten years old because of this inverse taxation, than it would cost to dispose of it as junk and purchase a more recent used car.

The use of such a tax program would be the equivalent to the use of the feedback principle in electronics, in industry, and in production.

The computed ratio of inverse taxation designed to stimulate the highest possible productive efficiency of this country, could be arrived at and we could save ourselves from the impending errors of our worn-out philosophies.

Gordon Speedie
22 Harvard Ave.
West Medford, Mass.

Who and Where Department

Please rush information to the writer in regard to material V-36 as mentioned in the Wrought High Temperature Alloys Table (Oct. 12, p. 176). Information as to manufacturer and address will be greatly appreciated.

R. F. Graser
1004 Cal St.
Huntsville, Ala.

• *Write to Larry Kelley, Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.—ED.*

In the Oct. 12 issue you have an article "Precoated Metals" (p. 156). Can you give us information as to what producers in this area could furnish the hot dip aluminum and hot dip tin or tin alloy finishes?

H. W. Behr
purchasing agent
Wire-O-Corp
Poughkeepsie, N. Y.

• *We suggest you contact Armco Steel Corp., Middletown, O., for information*

Please turn to p. 12

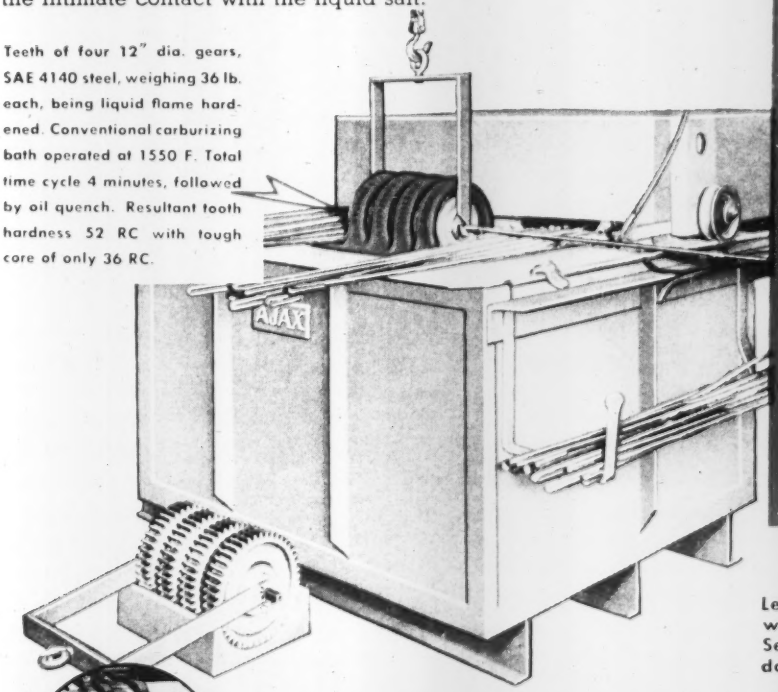
Something NEW in Selective Heat Treating . . .

LIQUID FLAME HEATING

This radically new but commercially proven application of the world renowned Ajax Salt Bath Furnace offers industry many unique advantages over any other method for selectively heating the rim or edges of circular objects, hardening teeth on gears or sprockets, and any other products that require peripheral heating.

The technique of operation is simplicity itself: Either a neutral type salt bath or a carburizing bath, heated by the internal electrode system, is maintained automatically at the required specific temperature. A number of the parts, such as gears, to be selectively heated can be mounted on a shaft within a suitable fixture which is placed over the salt bath. Only that portion of the periphery to be heated (such as the teeth) is immersed in the bath. The work is then rotated and heating is extremely rapid due to conduction by the intimate contact with the liquid salt.

Teeth of four 12" dia. gears, SAE 4140 steel, weighing 36 lb. each, being liquid flame hardened. Conventional carburizing bath operated at 1550 F. Total time cycle 4 minutes, followed by oil quench. Resultant tooth hardness 52 RC with tough core of only 36 RC.



COMPARE THESE ADVANTAGES . . .

with those possible from gas flame or induction heating

1 FAST AND UNIFORM HEATING

Speed of heating approximates the rate at which the work conducts heat. The hot "carry-over" layer of salt clinging to heated portion supplements heating, ensures uniformity.

2 NO OVERHEATING

Since no temperature "head" is employed, overheating of the work is impossible.

3 NO OXIDATION, SCALING, OR DECARBURIZATION

The surface of work heated is protected from air throughout entire operation due to the layer of liquid salt clinging to the revolving surface.

4 FLEXIBILITY

When not used for "Liquid Flame Heating", the salt bath is available for conventional heat treating uses.

5 LESS COSTLY

Entire operation, both as to temperature and timing, is automatic using unskilled labor. Large batches of work can be treated simultaneously, effecting important economies over a piece-by-piece operation.

HERE'S PROOF

Let us treat sample batches of your work without obligation in the Ajax Metallurgical Service Laboratory. Better still, come see it done yourself! Reprint No. 73 sent on request.

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OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

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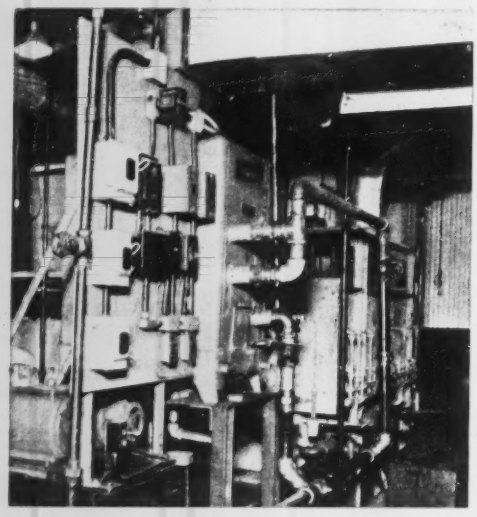
Your Department can have a better arrangement with Niagara Equipment that saves much space and increases your production.

This quench bath cooler gives you control of temperature and pays for itself quickly with water savings



● The NIAGARA AERO HEAT EXCHANGER transfers the heat from the quench bath to atmospheric air by evaporative cooling. It never fails to remove the heat at the rate of input, giving you real control of the quench bath temperature. This prevents flashing of oil quenches. In all cases it improves physical properties, saves loss of your product from rejections and gives you faster production, increasing your heat treating capacity. You can put heat back into the quench bath to save the losses of a "warm-up" period.

Savings in piping, pumping and power as well as great savings in cooling water return the cost of the equipment to you in a short time. The Niagara Aero Heat Exchanger saves nearly all of the water consumed by conventional cooling methods.

For the complete story of other benefits and savings, write for Bulletin 96.

NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. S, 405 Lexington Ave. New York 17, N. Y.

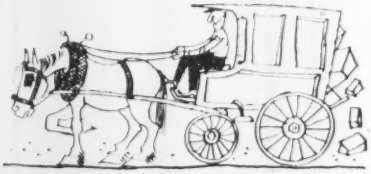
Experienced District Engineers in all Principal Cities of U. S. and Canada

LETTERS

Concluded from p. 10

on hot dip aluminum precoated strip. A number of steel companies produce hot dip tin and terne (lead-tin) coated steel. Thomas Strip Division, Pittsburgh Steel Co., Warren, O., produces an electro 85 per cent lead and 15 per cent tin precoated strip.—ED.

Topic with a Future



I am writing in regard to your article on centralization of warehousing by manufacturers and further with the shipping and handling of goods for those manufacturers.

Midland Corp. is a strong firm financially and is looking for this sort of information as we believe it will become more and more important in the future.

May we have a tear sheet of the article?

Walker M. Taylor
vice president
Midland Corp.
Memphis, Tenn.

● *We believe you're referring to the article "Distribution: New Designs Change Your Economic Future" (Aug. 3, p. 57), No. 6 in* STEEL*'s Program for Management, a tear sheet of which is sent.*

Program for Management

Please send me three reprints of your article "Select the Right Materials for the Job" (Oct. 12, p. 129), No. 8 in STEEL's Program for Management.

A. W. Gudal
supervisor, planning & controls
Lukens Steel Co.
Coatesville, Pa.

. . . we'd like six reprints of your excellent report.

Wayne A. Gornet
design engineer
Votator Division
Girdler Co.
Louisville, Ky.

● *In the Oct. 12 "Behind the Scenes" mention was made that reprints are available for each of the articles in* STEEL*'s Program for Management. Below is one of the many requests which followed that announcement. This, as well as the requests above, has been sent.—ED.*

As reported in "Behind the Scenes" for Oct. 12, your offer to supply reprints of STEEL's Program for Management series is hereby accepted! It would be very helpful if you would send me two copies of each article in the series.

Richard Doughton Jr.
staff metallurgist
National Academy of Sciences
National Research Council
Washington 25

Count on

WEIRTON

HIGH-CARBON STRIP
COLD-ROLLED SPRING STEEL

for uniform high-speed blanking and cold forming

Whether your problem is cold forming or blanking, you can depend on Weirton cold-rolled spring steel for best results. It has proved itself in a multitude of applications by consistently meeting the requirements of a variety of products where high fatigue-resistance is a principal factor.

Where superior forming qualities are of prime necessity, Weirton supplies spheroidized-annealed cold-rolled spring steel. The controlled grain structure provides exceptional ductility—assuring you of simple, economical fabrication.

Weirton also supplies cold-rolled spring steel that is temper rolled to produce controlled ranges of hardness and tensile strength. The desired ranges are designed to meet your specific requirements—assuring you of clean, economical blanking.

Close manufacturing control has resulted in these highly desirable qualities—unique in Weirton high carbon strip:

Accurate response to heat treatment.
Uniformity of gauge and width.
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Exact consistency of grain structure.
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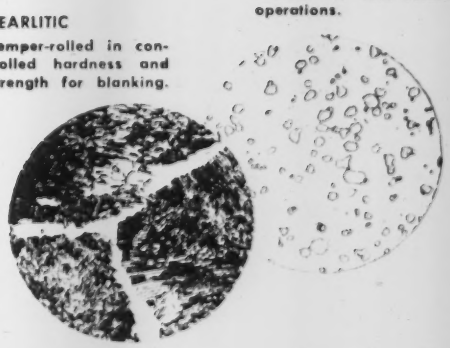
Weirton high carbon strip is available with the desired chemical analysis and for specific heat treating and hardness ranges, in widths up to seven inches.

SPHEROIDIZED
Annealed, soft and ductile —ideal for cold forming operations.

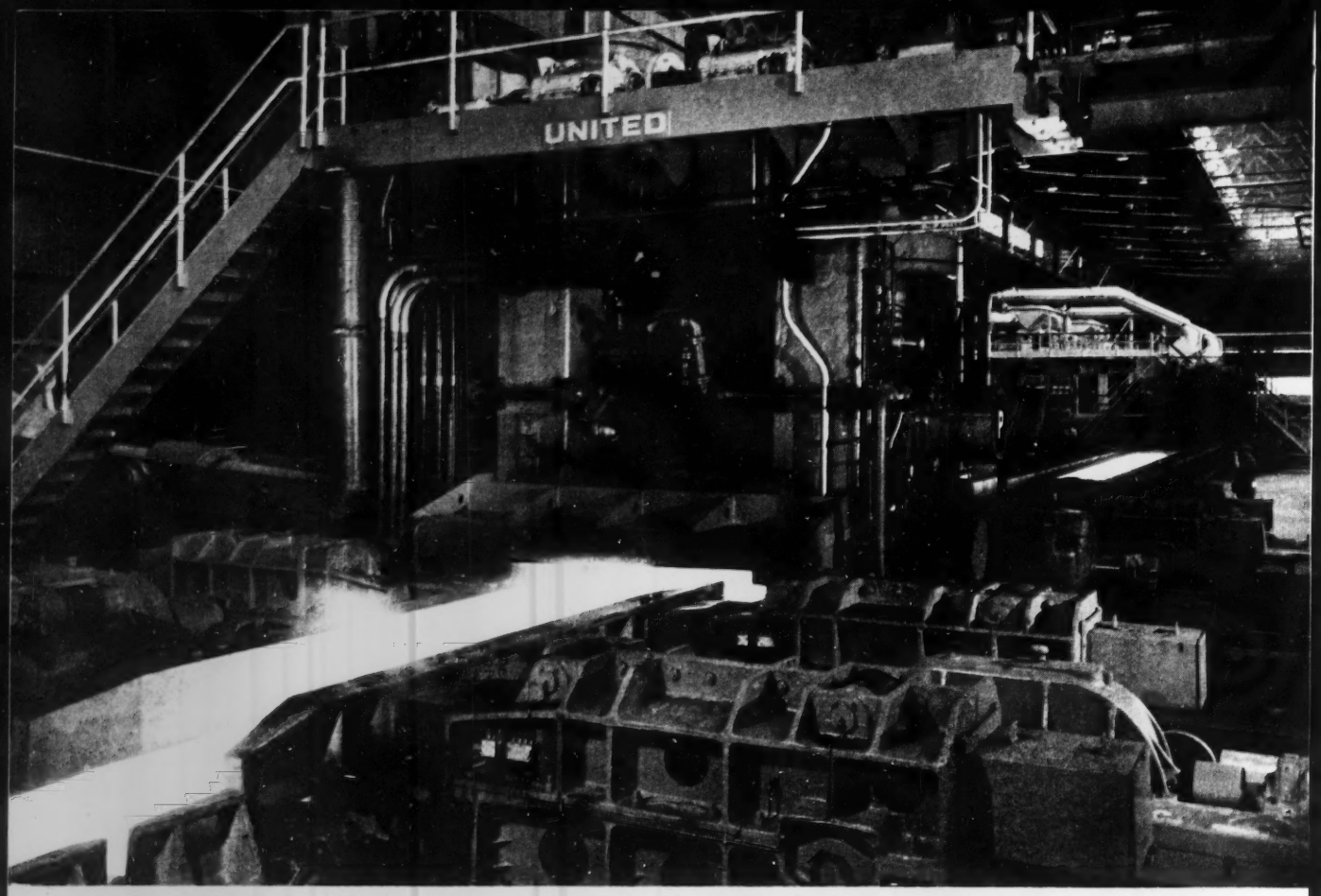
PEARLITIC
Temper-rolled in controlled hardness and strength for blanking.



WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



From this modern mill, one of the most versatile in the industry, comes . . .

Hot Rolled Sheet Steel—As You Like It

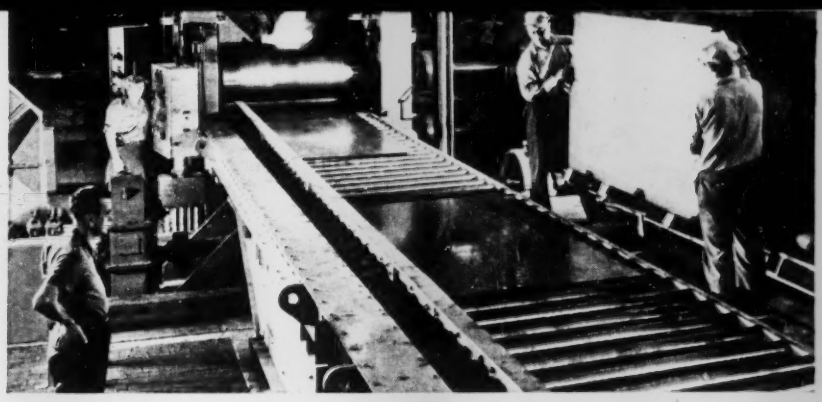
Pittsburgh Steel Company's sheet sales department, working in close cooperation with production men and metallurgists, can give you the kind of hot-rolled sheet steel you want—when you want it.

At the helm of sheet sales department at Pittsburgh Steel is John Cercone, Assistant General Manager of Sales. A veteran in the flat-rolled steel business, he shapes sheet sales policy.

The nerve center for processing and servicing your sheet steel orders in the Pittsburgh Steel general offices is headed by Frank Grunewald (right). In discussion with him are W. W. "Wib" Williams (center), and E. R. "Dick" McKinstry, sheet sales engineers.

(Advertisement)

On the firing line—Across the table from a purchasing agent is Pittsburgh district salesman, J. E. "Joe" Connell, discussing details for a sheet steel order. Joe is typical of Pittsburgh Steel salesmen calling on customers and prospects.



Hot-rolled sheets, custom built to customer's specifications, are given a temper pass to impart desired surface finish on this latest model temper mill at the new hot-sheet mill at Allenport, Pa. Each sheet order at Pittsburgh Steel Company begins with the selection of the most desirable raw materials; the best grades of iron ore, coke, and limestone that will make the finished sheet steel perform better in production and in ultimate end use.

Pittsburgh Steel Company is now firmly rooted in the flat-rolled steel business. Its brand new $28-million, 66-inch hot-rolled sheet mill is rolling out thousands of tons of sheet steel. And before year's end, the company expects to start up a spanking new cold-rolled sheet mill.

To back them up, the salesmen have a capable crew of rolling mill men operating their new machines. Alert metallurgists are checking quality at every process along the line from selection of the best raw materials to finished hot-rolled steel. The sheets rolled on this new mill are clean and free from surface defects, and have physical qualities as excellent as modern advances in science can produce.

That's why the men who are responsible for selling the products of this mill are eager to show what they can do for you.

What to look for—Good steel salesmen are made, not born. They must, like all good salesmen, have sales instinct, business ability, initiative and persistence and a thorough knowledge of their products and processes. In order to do a thorough job for customers, they must know the customer's problems, what he manufactures and his production methods.

Those are some of the reasons why it takes a long time to make a good steel salesman. And they are also the reasons why the men in Pittsburgh Steel's sheet sales department are ready to compete for their share of the sheet steel business.

The job of a Pittsburgh Steel salesman involves a lot more than persuading purchasing agents to buy the company's products. A salesman observes market conditions, he is aware of technological developments in the uses of steel and ready to answer questions and inquiries. He learns to understand the needs of customers and prospects, takes orders to meet production-line requirements, sees the order through to the customer's satisfaction. He does all of this and offers a lot more services that make him a valuable adjunct to your business.

If you use flat-rolled steel in the products you manufacture and you have a problem in the selection and use of carbon steel sheets, a Pittsburgh Steel salesman would appreciate the opportunity to demonstrate how he can deliver hot-rolled sheet steel exactly as you want it.

For a complete description of Pittsburgh Steel's new hot-sheet mill at Allenport, Pennsylvania, ask for your free copy of their 20-page brochure "Rolling Your Way." Also available is a 16mm sound motion picture in black and white entitled "Rolling Your Way": running time—13 minutes.

Four Packages to a Car—These wrapped coils of sheet steel are being anchored to the car floor for rail shipment. Other shipments of both coils and sheets go to customers over the highways by truck and down the rivers by barge.

"Everything New But The Name"

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

Sales Offices in Principal Cities Throughout the Country

(Advertisement)

your STAR distributor
has whatever you
NEED
in your
METAL
CUTTING
OPERATIONS

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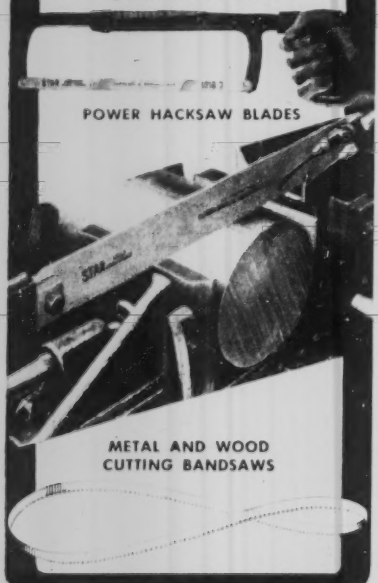

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CUTTING BANDSAWS

Back of every Star Blade are 75 years of metal cutting *experience*. When you ask for Star, you get a product made of the finest steels available. You get a product made on specially designed equipment which assures *uniformity*, shipment after shipment.

Your nearby Industrial Distributor is the man to call for Star Metal Cutting Blades. He is your logical source of supply not only for Star Blades, but for all the industrial supplies you need regularly and *quickly* to keep your production running on schedule.

STAR HACK SAW BLADES 75th ANNIVERSARY 1954

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Production Pointers from GISHOLT

GISHOLT TIME-SAVING IDEAS

Presented as a service to production men, we hope some of these interesting ideas, chosen from thousands of jobs, will suggest ways to help you cut time and costs in your own work.

GETTING MORE WORK PER CHUCKING WITH C/F TURRET LATHE

Only One Tool Change Required for Variety of Sizes with Expert Setup

This producer's problem was one of *sizes*. How to get fast operation on chuck bodies in a variety of sizes with minimum possible tooling and changeover.

The solution is smart . . . and noteworthy. A Gisholt 1L Cross Feeding Saddle Type Turret Lathe was selected for the job. This was equipped with a 15" 3-jaw air chuck. This not only kept chucking time low, but also, by the use of adjustable serrated jaw bases, just one set of jaws sufficed for operation 1 to handle the numerous sizes of workpieces.

The quick indexing square turret on the cross slide has tools for turning, facing, chamfering, etc. These work simultaneously with tools from the hexagon turret, a time saver on any job.

Cross Feeding Turret Speeds Job

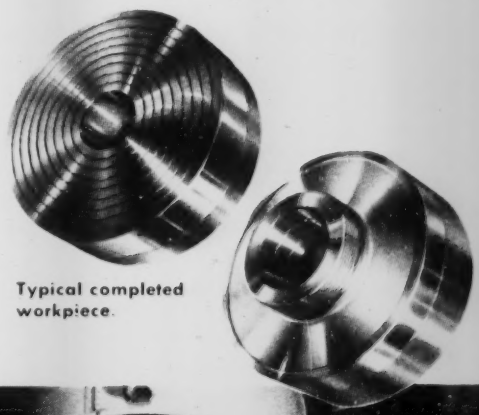
The hexagon turret is equipped with three stub boring bars for boring, counterboring, recessing or back facing. Size is set with the cross feeding turret; therefore, these same boring bars are used on many sizes of parts.

Also carried on the hexagon turret are two box-type tool posts. These are used for facing, boring or recessing. Again, because of the cross feeding hexagon turret, they are used for workpieces of various sizes.

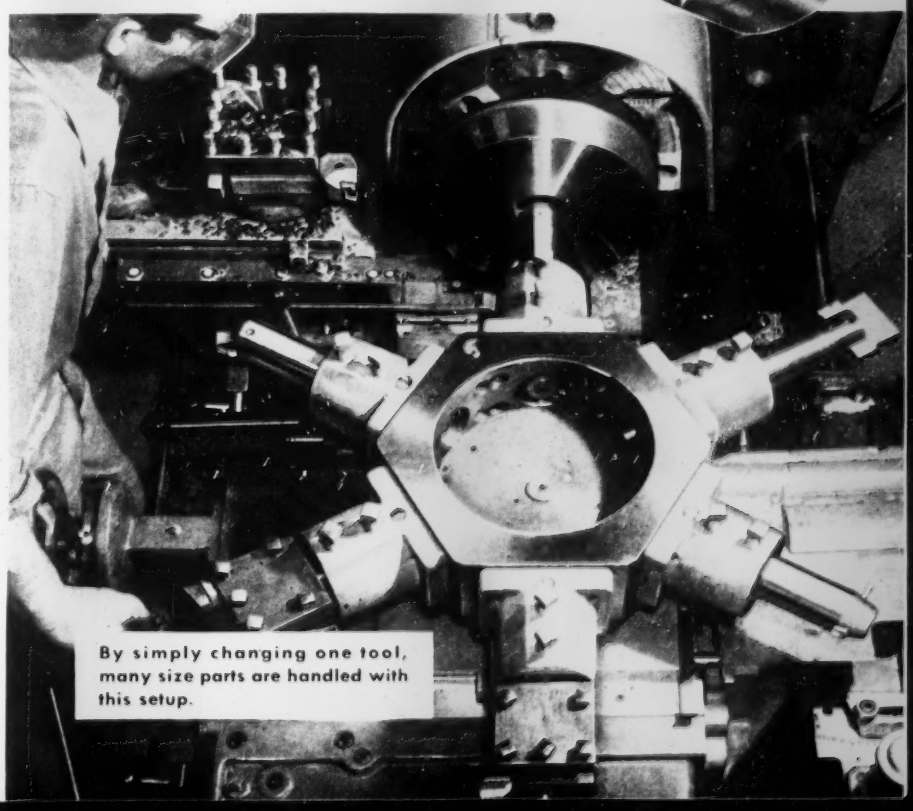
The sixth tool on the hexagon turret is a spade cutter for final sizing. This is the only tool special for each job. A quick change of this single tool readies the machine for the next job. The high production Saddle Type Turret Lathe has two additional attachments for even greater versatility. A threading attachment permits threading the hub when required. A taper attachment offers tapers up to 8 inches per foot for a wide variety of diameters.

This job shows again how you generally can do more work with fewer tools. When you specify a cross feeding turret lathe, Gisholt's 66-year experience can help you.

Simple tooling, combined with the time-saving cross feeding hexagon turret, give maximum efficiency in handling parts of various sizes.



Typical completed workpiece.



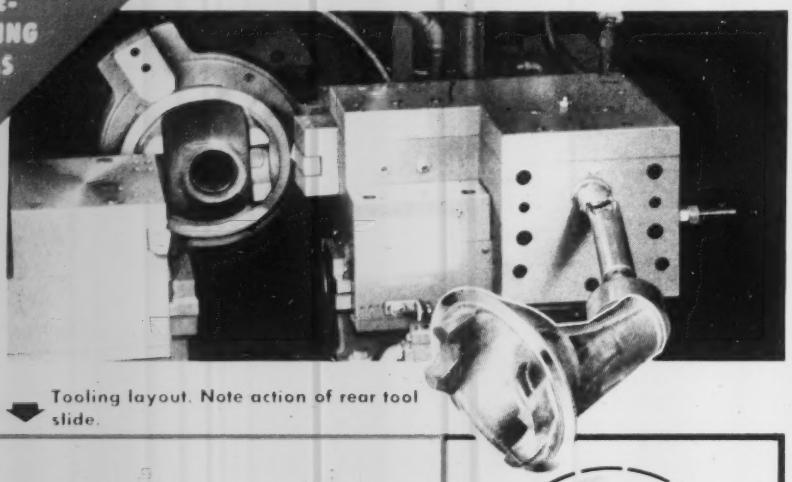
By simply changing one tool, many size parts are handled with this setup.

GISHOLT

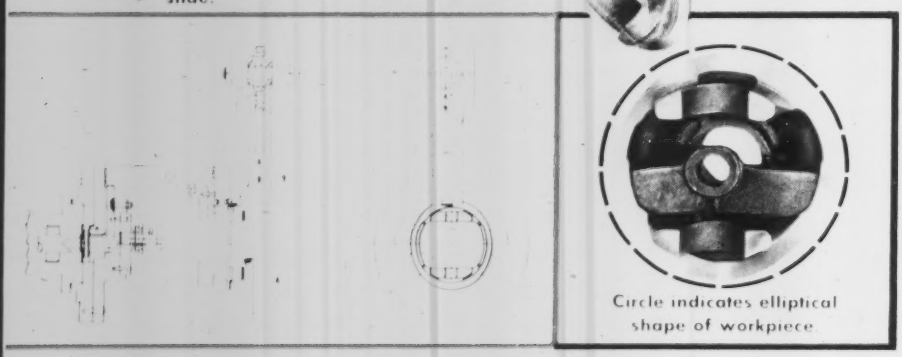
TIME-SAVING IDEAS

ELLIPTICAL MACHINING MADE EASY

Standard Simplimatics Solve Special Problem



Tooling layout. Note action of rear tool slide.



Circle indicates elliptical shape of workpiece

An elliptical diameter was the stickler here. How to machine the oval shape . . . and do it on a standard machine and do it automatically?

The answer, this manufacturer found, was with the 5D Simplimatic Automatic Lathe. To do the elliptical pilot diameter on this differential carrier, a standard machine is used. Only a special cam-operated auxiliary tool, slide mounted on the standard rear slide, is required. This does both facing and turning and moves in and out two times each spindle revolution, generating the elliptical shape. When conventional facing and turning are called for, this slide is simply locked in position.

The standard front slide can be used for either facing or turning the bearing pads, merely by re-positioning at a 90° angle. Time for this part is 1.75 min. and one operator easily handles two identical machines for all production needed. Four different carriers are handled with simple changeover.

The simple addition of a special reciprocating tool slide equips standard Simplimatics for fast, automatic production of elliptical parts.

For complete picture reports on this and 30 other interesting jobs, write for new Simplimatic catalog.

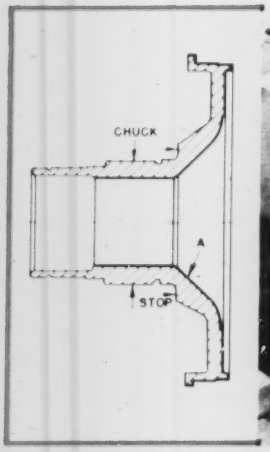
NOVEL SETUP FOR STEEP BORING

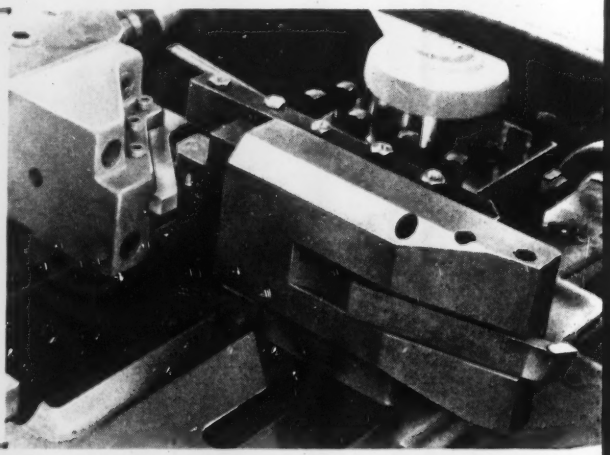
This Idea Pays Off on Ram Type Turret Lathe Job

The next time you are faced with generating a steep bore similar to this, remember this production pointer.

The problem surface (see A in drawing) combines a face, radius and a 45° angular bore. Using a standard Gisholt No. 4 Ram Type Turret Lathe, a special cam is mounted on one face of the hexagon turret. On the square turret is a special spring-loaded roller slide. Here's how it's done:

Both the hexagon turret and square turret carriage are brought into position and locked. The cross slide carrying the square turret is then fed forward. As the roller on the slide tool engages the cam, the tool bit generates the interior surfaces shown. From start to finish, the job is simple. All other tooling is standard. Thus, you can handle this job—or a variety of others—quickly, economically, with very reasonable tooling costs.





The complicated interior of these rotors are generated with repetitive accuracy by the cam-guided slide tool in the square turret.

Note how sliding tool on square turret is guided by cam on hexagon turret.

GISHOLT

GISHOLT

TIME-SAVING IDEAS

SHELL PRODUCTION...ON THE DOUBLE

No. 12 Hydraulic Lathes Enlisted for Speedy Operation

Speed was the No. 1 requirement here . . . in centering and cut-off operations on 75mm. and 105mm. shells.

Here's how two different plants are pushing production using identical setups on No. 12 Hydraulic Automatic Lathes: The forgings are located from the bottom of the cavity on a mandrel and held by two sets of air-operated expanding fingers.

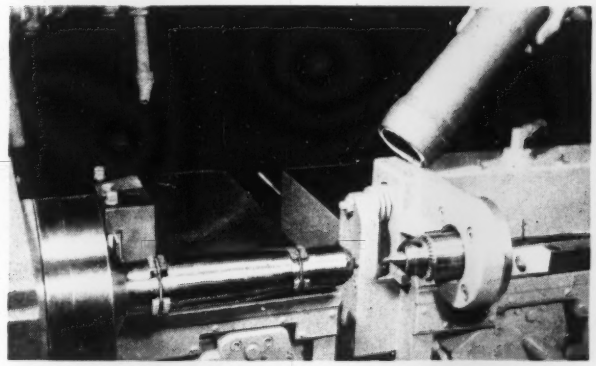
The left rear slide carries a tool block with a single tool for cut-off to length. The right slide carries an auxiliary slide on which is mounted a speeder with a center drill. The main slide moves back at the end of the cycle to clear the work for unloading.

Floor-to-floor time on the 75mm. shell (photo A) is about 0.6 minutes. Time for the 105mm. shell (photo B) is approximately 0.8 minutes. In both cases, the operators have ample time to handle two or more machines because of the automatic cycle.

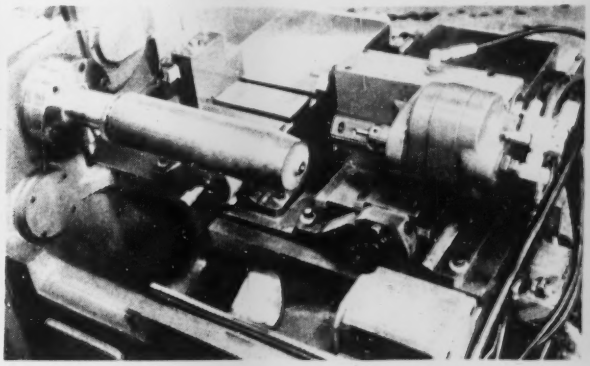
In this first machining operation, shells are faced to length . . . open end is squared . . . and proper center is established—all handled automatically, quickly and economically.

A complete catalog on the No. 12 Hydraulic Lathe is available.

(A) Close-up of No. 12 Hydraulic Automatic Lathe for work on 75mm. shell shown.



(B) Time for this 105mm. shell is 0.8 minutes.



4-MACHINE SETUP MAKES FAST WORK OF THIN-WALL PARTS

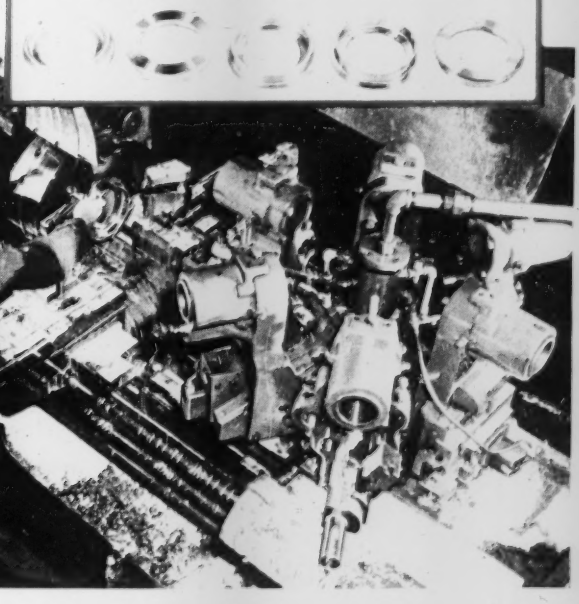
Costs are Low with one man and four Fastermatic Automatic Turret Lathes

This problem was one of accurately producing parts which require considerable stock removal, leaving them thin and frail. This precludes taking off too much metal at one time. Also, heavy chucking pressure has to be avoided to prevent distortion.

The only practical way to do it is by spreading the work over a series of relatively light cuts and doing the job automatically to keep costs low. The Fastermatic Automatic Turret Lathe, therefore, was the logical solution—with four machines handling all operations. All machines can be handled by one man since total labor time is six minutes per piece. The .004" tolerance demanded by the thin-wall section is easily met because of the Fastermatic's automatic cycle and the elimination of human error.

These thin-wall parts are accurately and economically produced by a sequence of light cuts with four Fastermatics and one man.

Rough part and after each of four operations.



Setup on one of four Fastermatics doing this job

GISHOLT

GISHOLT

TIME-SAVING IDEAS

HOW BALANCING PROTECTS THIS VITAL AIRCRAFT ASSEMBLY

Required Correction Shown by Direct Readings

Vibration means trouble for aircraft cabin superchargers. To insure smooth, dependable operation at high rotating speeds is this Type 138 Gisholt DYNETRIC Balancing Machine.

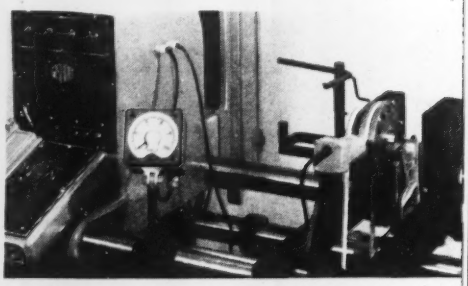
This 6-lb. assembly is supported in a cradle, rotated at 2300 r.p.m. and the amount and location of unbalance in each plane recorded. Stock is then ground off until a recheck indicates that the tolerance of .424 gram-inches has been met.

Each scale unit on the machine's direct-reading amount meter represents .1 gram-inch of unbalance. Therefore, the operator need balance to only 4.24 scale units on the meter to be within the prescribed tolerance for each correction plane. The extreme sensitivity of the machine with dial readings which provide an amplification of unbalance effect, permits greater ease and handling speed.

Whether unbalance is read in terms of stock to be removed or length of material to be added, ease of calibration is just one important feature of Gisholt Balancers.

Unbalance in terms of gram-inches is quickly measured by this Balancer with correction made by grinding off metal.

DYNETRIC BALANCERS GISHOLT



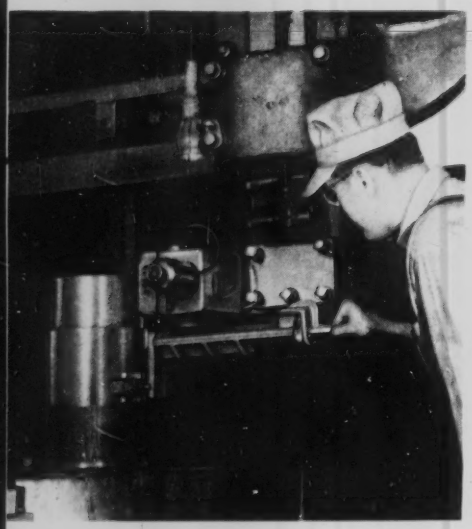
Simple to operate, this Balancer gives fast, accurate unbalance readings in gram-inches.

Production Balancing

. . . is one of the many helpful subjects fully covered in the Gisholt Balancing School—only service of its kind available to industry. Write for details and starting dates . . . four classes scheduled for January and February.

SIMPLE SOLUTION TO SPECIAL CRANKSHAFT PROBLEM

Nordberg Shows How Big Job is Handled At Small Investment with Superfinishing



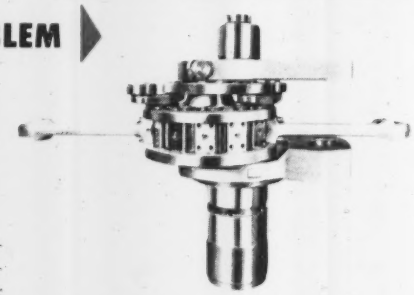
Superfinishing large bearing surface by means of attachment to boring mill.

No. 11-1253
614

Like many others, Nordberg Manufacturing Company solved an otherwise difficult problem through the simple expedient of Superfinishing. Extra-long bearing life is assured because Superfinish takes these critical surfaces down to base metal, removing the soft, annealed "smear metal" left by grinding heat.

The crankshafts in Nordberg Radial Engines have a *single* throw and require only two main bearings. With the force of 2125 h.p. acting on these bearings, as in the case of a 12-cyl. model, you can see the need for an accurately controlled bearing surface.

This is done at extremely low cost, both in equipment investment and in time—because of the adaptability of this modern process. Using existing equipment, a No. 3 Superfinishing Attachment is mounted in a standard tool-head of a vertical boring mill. The workpiece is clamped to the rotary table in the usual manner, completing the simple setup.



Superfinishing is satisfactorily accomplished with on-hand equipment . . . without the expense of a special machine for this operation.

See how the basic advantages of Superfinishing—better, longer-wearing surfaces that cost less—can be applied to your problems. The textbook, "Wear and Surface Finish," reports fully on Superfinishing; ask for it.

With a low-cost attachment for existing equipment, these very large bearings get better, longer-lasting surfaces through Superfinishing.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

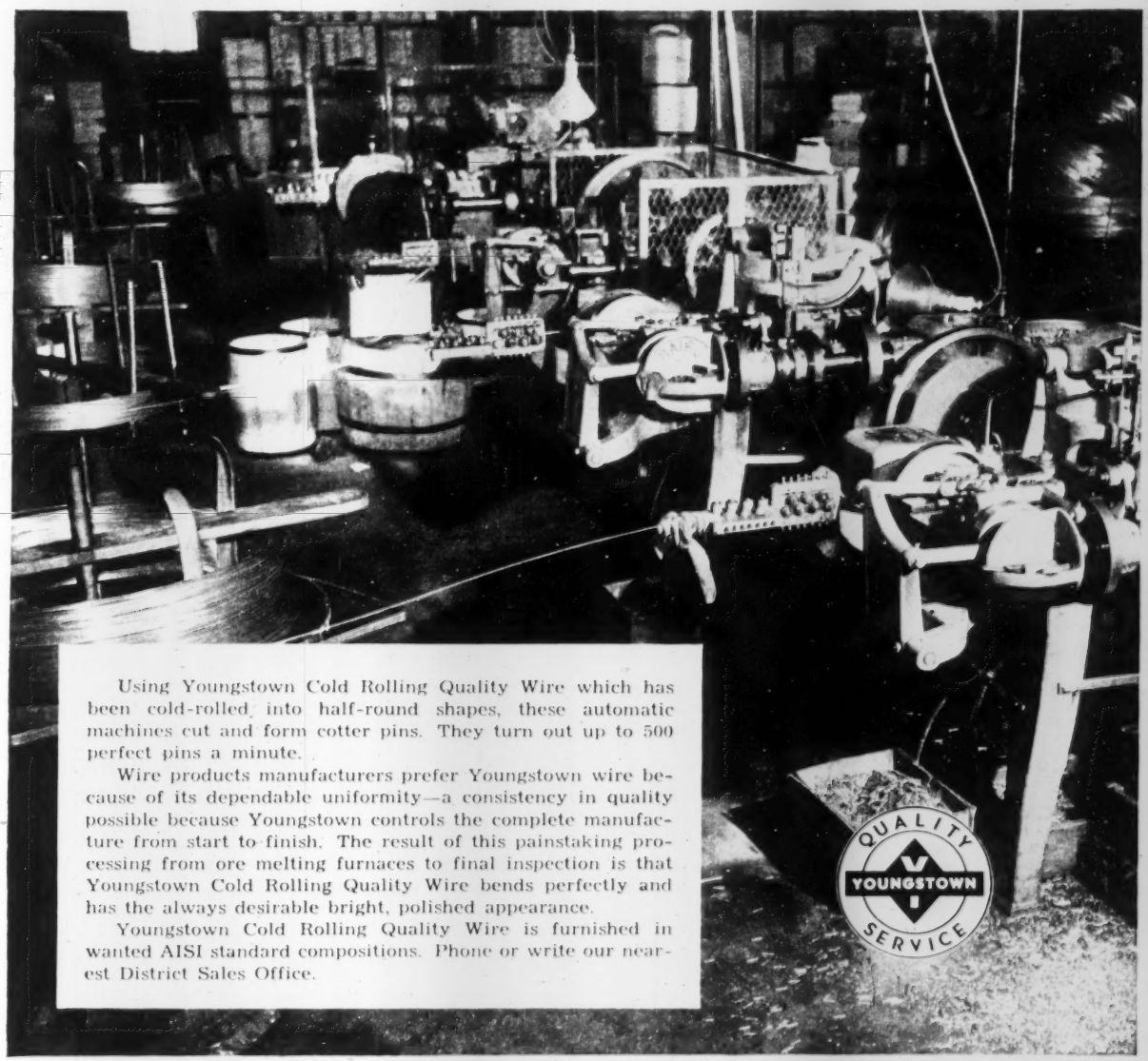
GISHOLT

Write for your copy of Gisholt's new general catalog.

MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

500 PERFECT COTTER PINS A MINUTE WITH PERFECT-BENDING YOUNGSTOWN WIRE



Using Youngstown Cold Rolling Quality Wire which has been cold-rolled into half-round shapes, these automatic machines cut and form cotter pins. They turn out up to 500 perfect pins a minute.

Wire products manufacturers prefer Youngstown wire because of its dependable uniformity—a consistency in quality possible because Youngstown controls the complete manufacture from start to finish. The result of this painstaking processing from ore melting furnaces to final inspection is that Youngstown Cold Rolling Quality Wire bends perfectly and has the always desirable bright, polished appearance.

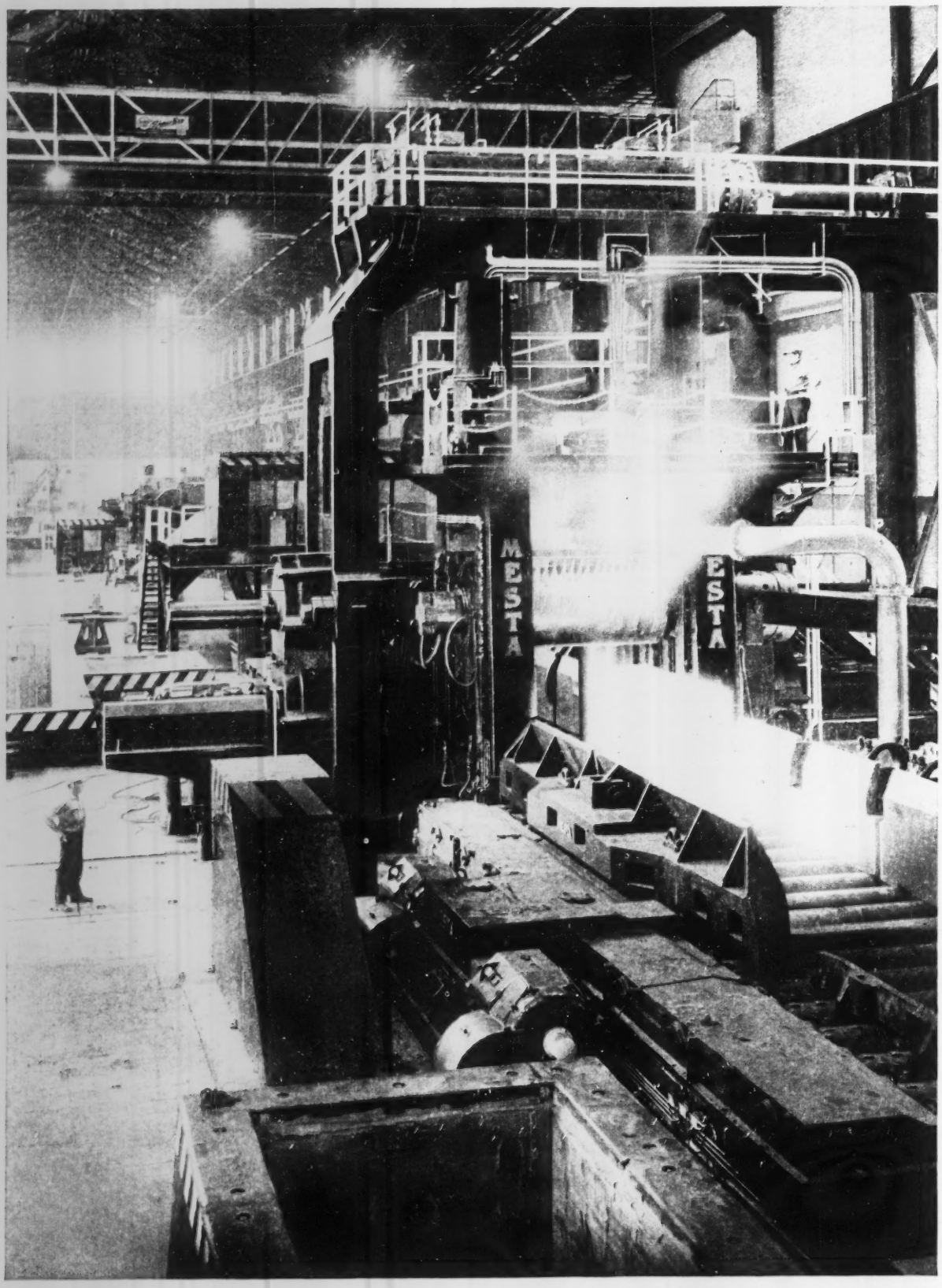
Youngstown Cold Rolling Quality Wire is furnished in wanted AISI standard compositions. Phone or write our nearest District Sales Office.

Youngstown COLD ROLLING QUALITY WIRE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES



GREAT THINGS

STEEL

Rolling Today!

new slab mill at work for the car makers

Completed now—two months ahead of schedule—is the new mill at Great Lakes Steel. Right now, it is one more unit in full operation—passing white-hot ingots back and forth through its giant rolls, squeezing them down into slabs to feed our rolling mills.

This mill is great news for the automotive industry. It makes bigger slabs, letting us roll out longer, heavier coils of sheet steel, cutting loss of time and material for the car makers. Good news, too, is the fact that by December of this year, a month ahead of schedule, we'll have an annual capacity of *four million ingot tons.* That tonnage is about 25% of the car makers' total needs for steel, and about 40% of their needs in the kinds of steel we make. So Great Lakes is now more than ever a *dependable first source* of steel for automobiles.

It was because motorcar makers need a steel company that's both available and flexible that Great Lakes Steel was set up in the first place, many years ago. *Availability* meant, for one thing, easy reach . . . right in the heart of the industry. *Flexibility* meant no dependence on other suppliers. We start with ore, and take it through our own blast furnaces, bessemers, open hearths, slabbing mills, hot and cold rolling mills and merchant mills, right down to the finished forms. That lets Great Lakes do a real job.

You can count on great things from Great Lakes. For we're aiming to serve our customers well, in many fields . . . and especially in the mighty automotive industry. Great Lakes Steel Corporation, Detroit 29, Michigan.

Great Lakes Steel

NATIONAL STEEL CORPORATION

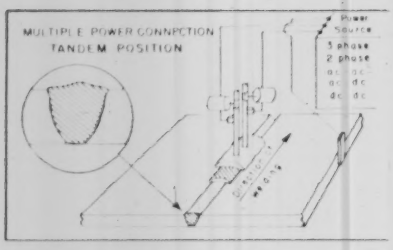
HAPPEN AT GREAT LAKES STEEL

CUT YOUR WELDING TIME IN HALF *with* UNIONMELT

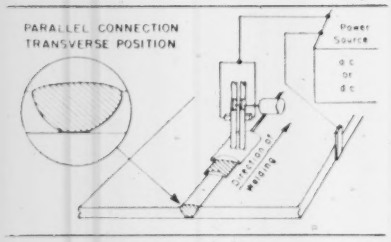
Multiple Electrode Welding

UNIONMELT Multiple Electrode welding with two or more electrodes in tandem, transverse, or other positions increases welding speeds up to three or four times faster than single electrode welding.

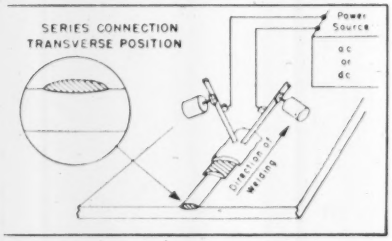
By using two or more electrodes in the same weld zone, magnetic reaction can be regulated to provide exceptional control over arc direction and weld shape.



Extra High-Speed Welds are made with multiple power connection and the electrodes in the tandem position. Speed is three to four times that of single electrode welding. This is particularly suited for welding long continuous seams, well-prepared and well-fitted, as in pipe, tanks, pressure vessels, and structural assemblies.



Extra Wide, High-Speed Welds are made with parallel power connection and the electrodes in the transverse position. Speed is twice as fast as for single electrode work. This is particularly useful for welding seams with gaps or other irregularities, as in center sills, ship plate, and heavy, hard-to-fit work.



Extra Shallow, Wide Welds are made with the series power connection and the electrodes in the transverse position. Speeds are many times faster than single electrode work and the dilution of the deposit is far lower than can be produced with a single electrode. This process will open new possibilities for surfacing and cladding all kinds of articles by automatic welding.

Complete UNIONMELT machines are available for multiple electrode welding and all UNIONMELT apparatus is designed for easy installation in any plant or factory. LINDE'S engineers will be glad to determine how UNIONMELT Multiple Electrode Welding can best benefit you. Call your nearest LINDE office for more details on UNIONMELT Multiple Electrode Welding.

Linde
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LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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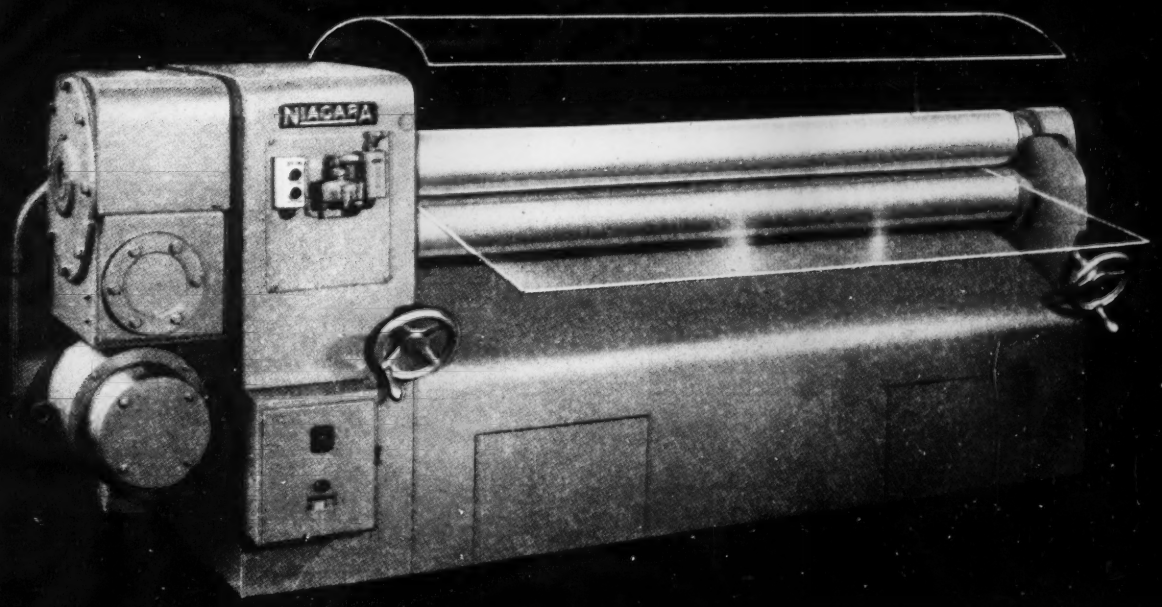
NIAGARA

ANNOUNCES



new all steel BENDING ROLLS

- Produces commercially true cylinders from thinnest sheets to maximum capacity.
- Rolls a multitude of bends in various shapes including oval forms, rectangular pipes, rounded end containers, cones etc.
- Pinch-type construction materially reduces flat spots on leading and trailing edges of work.
- All three rolls power driven permitting smaller diameters and easy operation with light gage sheets.
- Air operated drop end automatically tilts upper roll for easy removal of rolled cylinder.
- Power adjustment for rear roll saves time and effort.
- Roll position indicators allow operator to quickly duplicate roll settings for repeat jobs.
- Rapid reversal and positive jogging of rolls gives operator accurate control at all times.
- Magnetic brake on main motor prevents "drifting" of work, enabling operator to do accurate work without guessing.
- Unbreakable steel construction. ▷ No special foundation required.

6" Roll Series
Capacities 5/16"x 48";
3/16"x 72" and 12 ga x 120"

Write for new Bulletin 88

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

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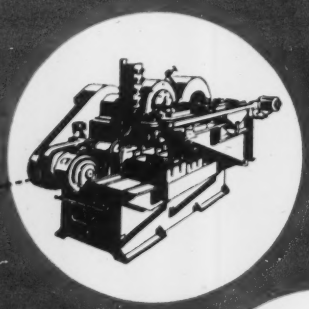
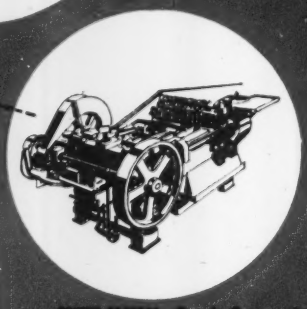
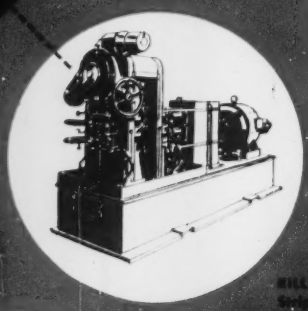
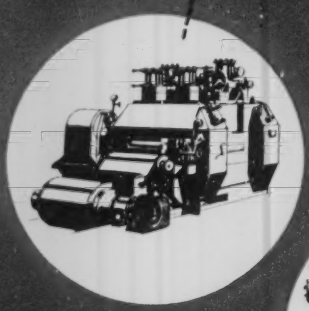
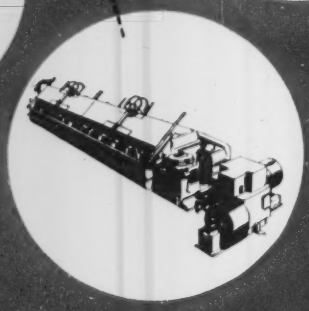
5 KINDS OF WATERBURY FARREL ANSWERS TO YOUR MASS PRODUCTION PROBLEMS











Within These Basic WF Equipment Lines, Individual Machines Are Custom-Engineered For Specific Applications

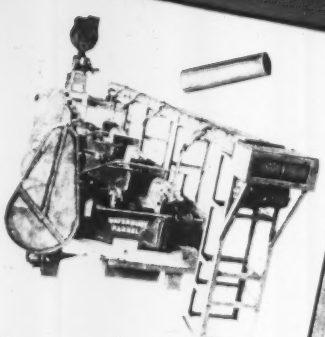
If your metal-working machinery problem falls into any of these five groups, there are good reasons for looking to Waterbury Farrel for the answer.

There's Waterbury Farrel's continuing engineering research with more than a century of machine building experience to draw upon. This results in soundly designed and thoroughly tested features which improve production.

There's Waterbury Farrel's world-wide reputation for rugged, long-lasting construction. This gives you the assurance that WF machines are built to provide long years of uninterrupted production.

Waterbury Farrel can custom-engineer special equipment or adapt a standard machine to fit your specific problem.

For further information, write for free booklets on any of the machines mentioned on this page or contact your nearest WF office.



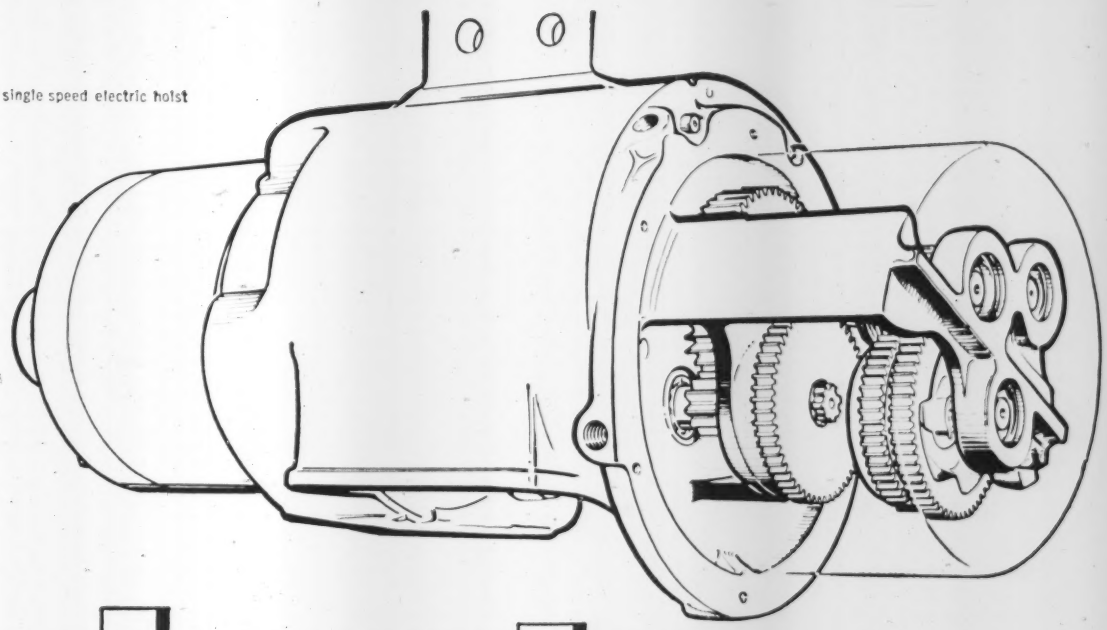
HERE'S A SAMPLE of Waterbury-Farrel mass production equipment in action. This complete WF automatic production unit combines a 40-ton double-acting, upright blanking and cupping press, a conveyor feed and four 7-station horizontal drawing presses to draw 340 zinc shells per minute.

FOUNDED WATERBURY FARREL 1851

WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

Type "J" single speed electric hoist



plenty

of everything to spare

STRENGTH TO SPARE—Robbins & Myers "J" Hoists are loaded with strength—extra strength in the frame, in the shafts and gears, in the cable and hook. They are built to lift your loads . . . today, tomorrow, and for years.

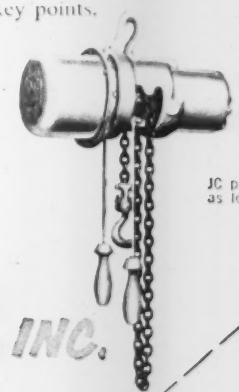
POWER TO SPARE—Special Robbins & Myers hoist motors, rated conservatively with ample reserve for overloads, make "J" Hoists integrated units. One maker responsibility guarantees matched parts of higher quality without question.

SAFETY TO SPARE—Twin safeguards—an oversized shoe brake on the motor and a Weston-type load brake with non-reversing clutch—give instant control over the load. Flanges and a limit switch keep the cable and hook from over-riding the drum.

PRECISION TO SPARE—Close tolerances . . . long life bearings . . . perfect sealed lubrication . . . have been liberally engineered into "J" Hoists. They give you most hoist and hoistwork per dollar invested.

(R & M "JC" electric chain hoists, give the most hoist per dollar and *at the lowest price today*. Single and double chain reeving—capacities from 500 to 2,000 lbs.) Stocks available at key points.

Load Capacities	500 to 4,000 lbs.
Headroom required	20" to 31"
Speeds	15-30 f.p.m. for 220-440-550V 3-phase 60-cycle, or 110-220V single-phase.
Suspension	Lug, hook, push, hand geared, and motorized trolleys.



JC prices start as low as $188.00.

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VENTILATORS MOYNO PUMPS HOISTS CRANES MOTORS & GENERATORS FANS

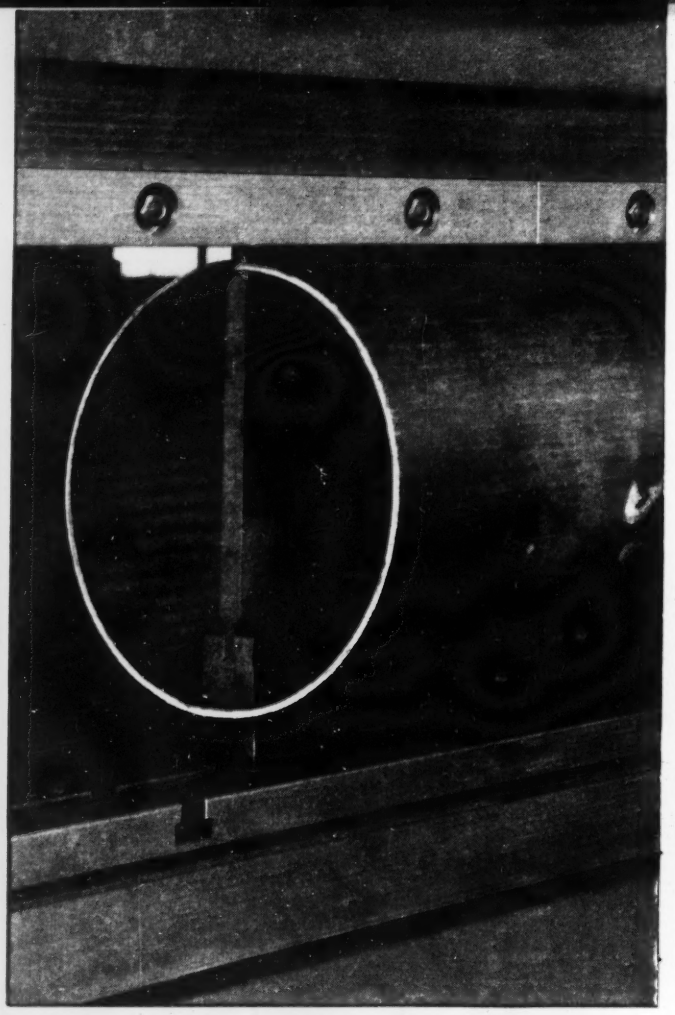
clip
staple to letterhead
add name & title

Please have representative call ☐

Please send J hoist bulletin No. 451 ☐

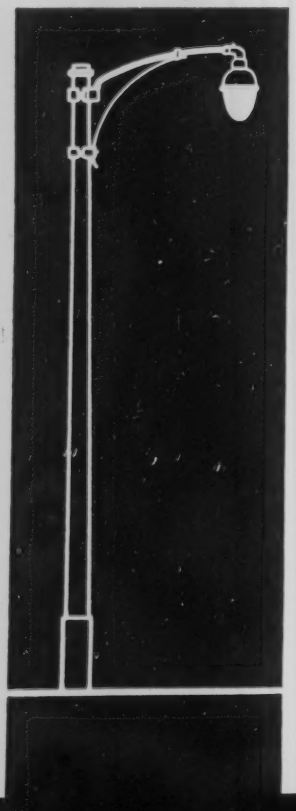
Please send JC hoist bulletin No. 852 ☐

pipes ...tubes ...posts



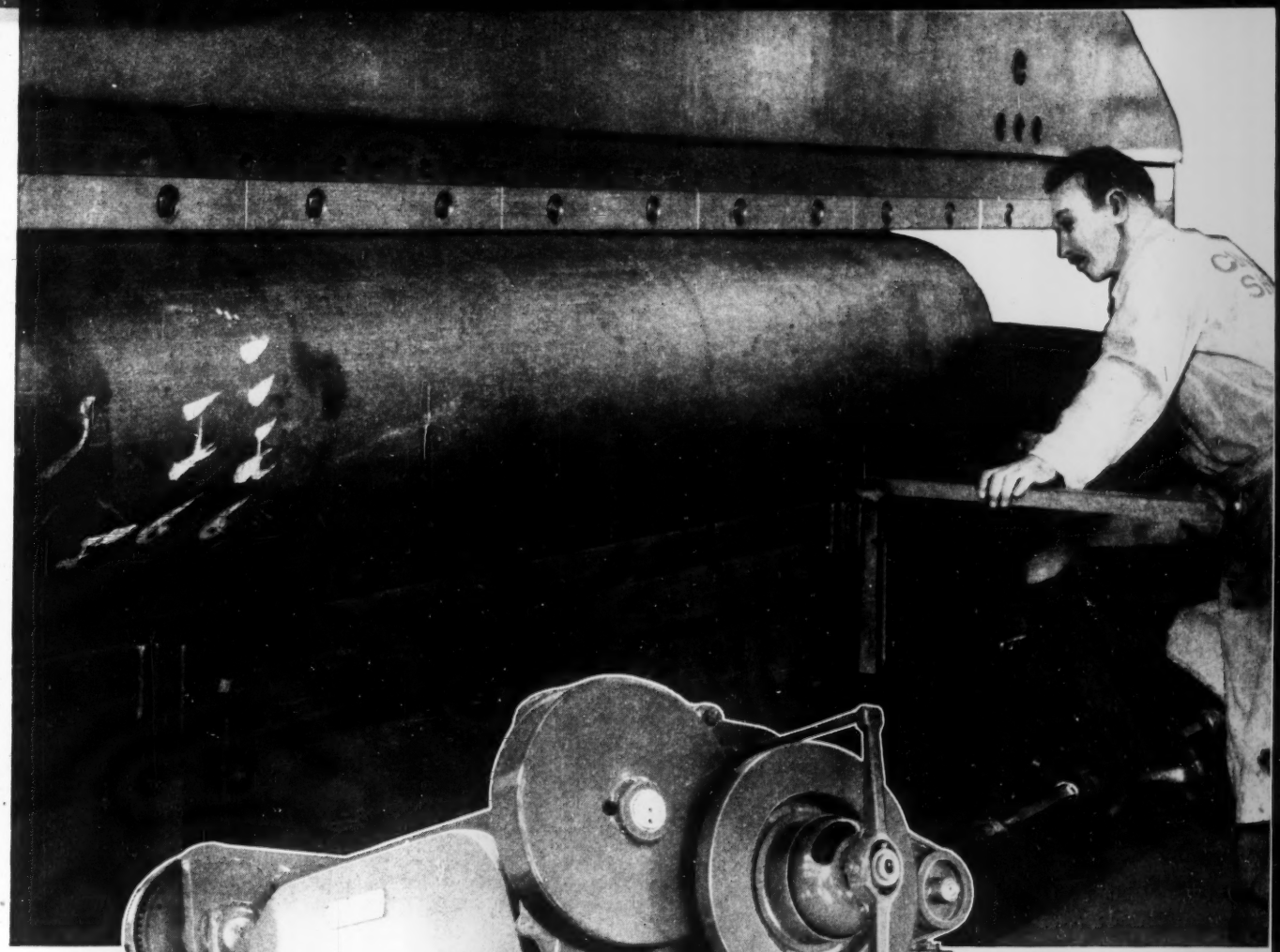
...ACCURATELY and EASILY formed on

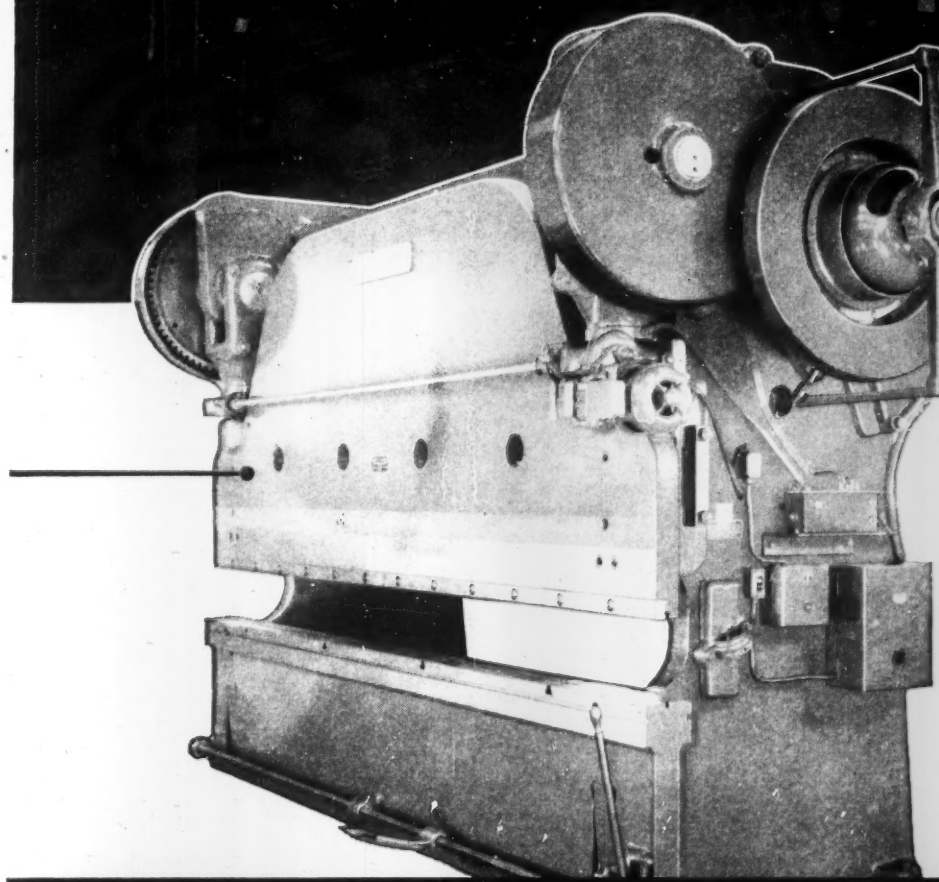
Cincinnati Press Brakes



Large diameter pipes and tubes can be completely formed on versatile Cincinnati Press Brakes. Round, tapered lamp posts up to 30 feet long are also formed by prekinking the edges and then completing the tapered tube in several additional hits on taper dies.

Cincinnati Press Brakes also crimp sheet and plate before rolling to eliminate flats at the seam edges.





Write for **New 72-Page Press Brake** catalog B-4 and recommendations on your problem.

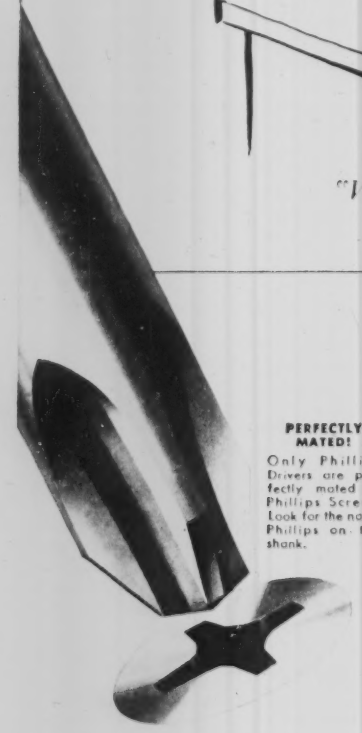
THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

What's Screwy? by Phillips

"Very fancy, dear, but wouldn't it be cheaper to use Phillips Cross-Recessed-Head Screws?"



PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

FREEDOM FROM DRIVER SKIDS is just one of the advantages of Phillips Screws. No danger of marring the finish. In addition, they drive in much faster. And they add to the structural strength of the product, too — set up tighter and resist loosening under vibration.

The identifying X on the cross-recessed-head identifies the X-tra quality of Phillips Screws at a glance. Be sure to specify "Phillips."

PHILLIPS *Cross-Recessed-Head* SCREWS

X marks the spot... the mark of extra quality

AMERICAN SCREW COMPANY • ATLANTIC SCREW WORKS, INC. • THE BLAKE & JOHNSON CO.
CENTRAL SCREW COMPANY • CONTINENTAL SCREW COMPANY • THE EAGLE LOCK COMPANY
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THE LAMSON & SESSIONS COMPANY • NATIONAL LOCK COMPANY
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SHAKEPROOF DIV. OF ILLINOIS TOOL WORKS • THE SOUTHINGTON HDWE. MFG. COMPANY
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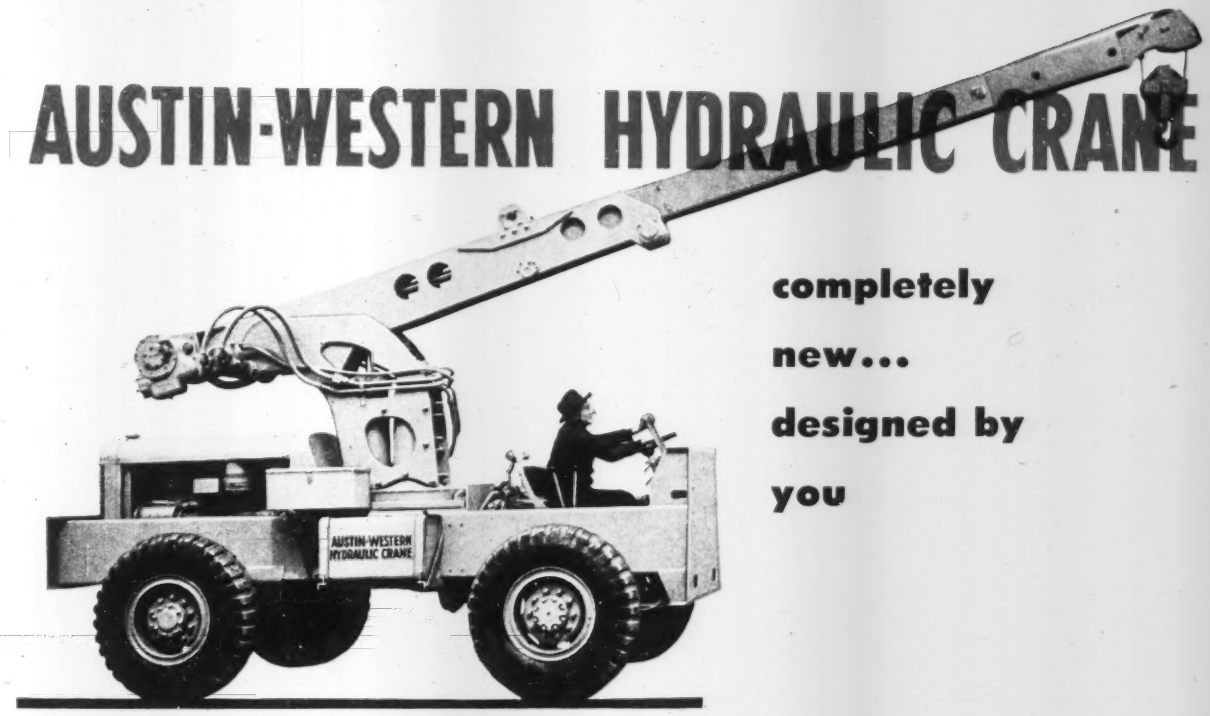
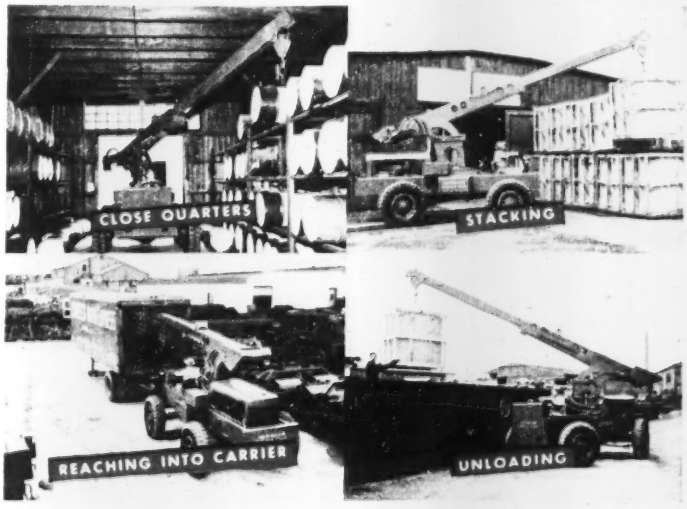
TODAY'S . . . AND THE FUTURE'S . . . FINEST FASTENER

AUSTIN-WESTERN HYDRAULIC CRANE



completely new... designed by you

the crane of unlimited indoor-outdoor use



Designed only after making a complete analysis of your crane requirements—here is TOMORROW'S answer to TODAY'S materials handling problems.

Completely hydraulically operated including

- **Continuous 360° turntable rotations**
- **Extension and retraction of the boom**
- **Raising and lowering of the cable**
- **Boom elevation**

This amazing, new, self-propelled Hydraulic Crane, with its pickup, carrying and placement capabilities combines the best features of crawler, truck and erection cranes with those of industrial shop cranes . . . and, like all other Austin-Western products, it's "Built to Outperform".

Send for additional information NOW.

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Construction Equipment Division • Baldwin-Lima-Hamilton Corporation
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AUSTIN-WESTERN COMPANY
623 Farnsworth Avenue, Aurora, Illinois

Please send complete information and literature on the Austin-Western Hydraulic Crane

Name

Title

Company

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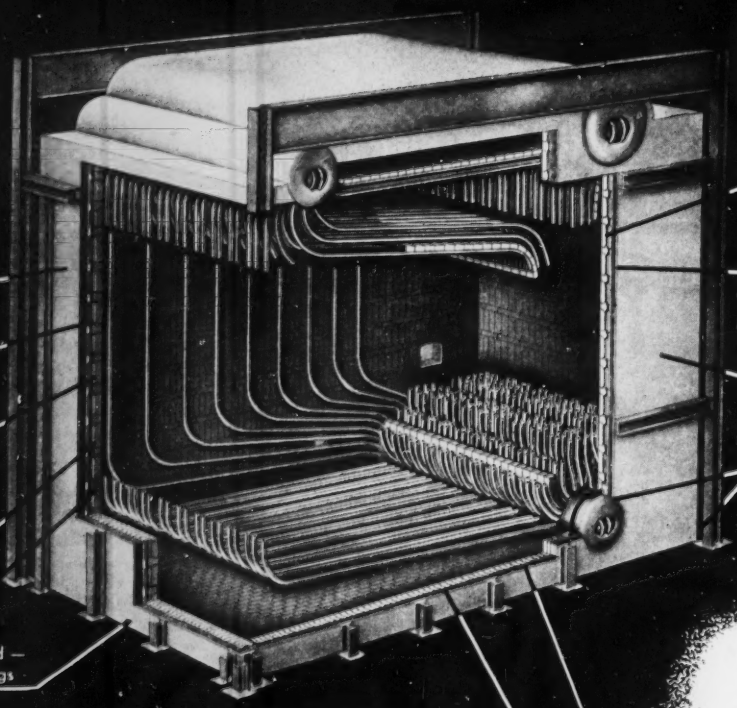
City Zone State

Other products: Power Graders, Motor Sweepers, Road Rollers

Look at all the advantages of B-L THIN WALL *construction for Industrial Furnaces*



Completely air tight

Minimum heat loss

Unit-suspended construction

Walls erected quickly — from inside or outside of furnace

Ample tile offsets

Individually engineered — easy-to-follow drawings

Thin, light-weight refractories

3-ply insulation seal — plastic, block, plastic

Weatherproof TEXAD* finish — no expensive steel casings

Special drum and corner seals

No cumulative expansion

No cumulative loading

*TRADEMARK

WRITE FOR YOUR COPY OF BL'S NEW THIN WALL CATALOG . . . TODAY!

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UNIT-SUSPENDED WALLS AND ARCHES

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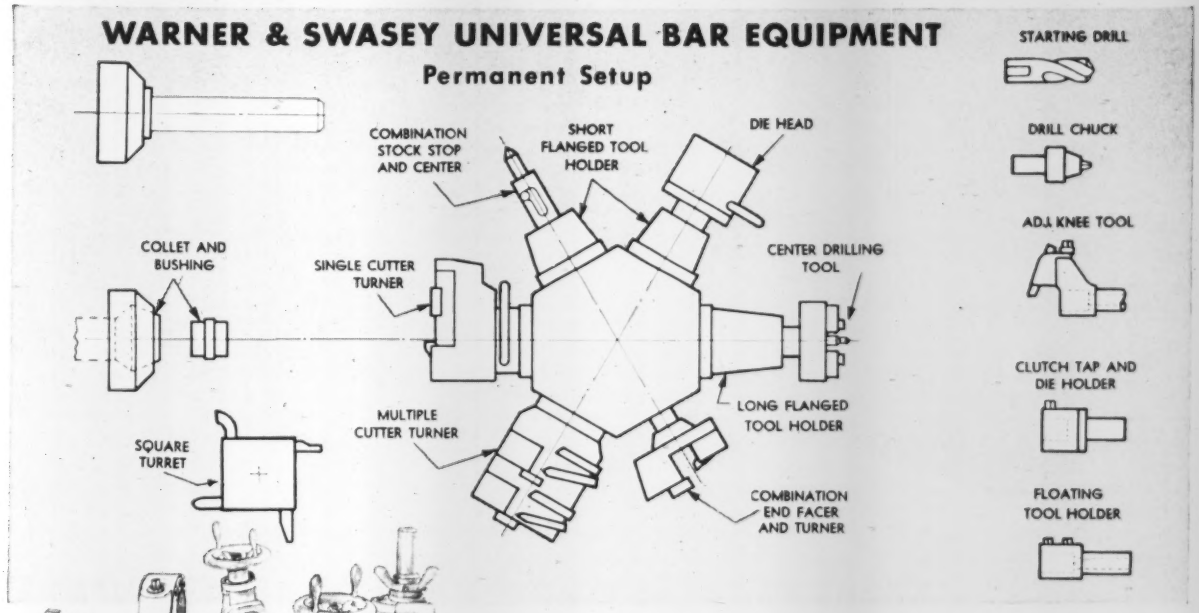
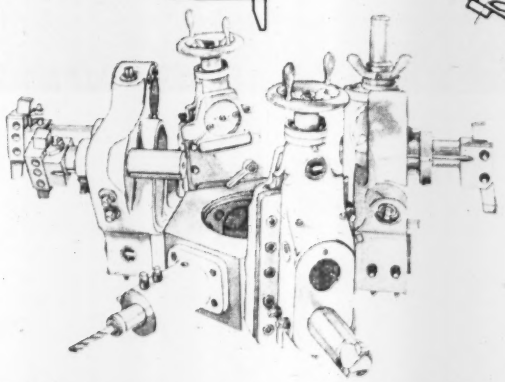
WARNER & SWASEY UNIVERSAL BAR EQUIPMENT

Permanent Setup





Use Warner & Swasey Standard Tools to

SPEED UP – SIMPLIFY YOUR PRODUCTION

YES, *you* can make Warner & Swasey standard turret lathe tools and Universal Tooling Setups *pay off*—with increased production, less setup, handling and cutting time, longer tool life. This free book clearly and simply explains how to select tools and improve setups, combined and multiple cuts, and many other modern tool applications. Fill in and mail the handy coupon for your free copy—*today!*

THIS FREE BOOK TELLS YOU HOW

WARNER & SWASEY COMPANY
Department 320-S, Cleveland 3, Ohio

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Please send me my free copy of "Turret Lathe Tools" today!

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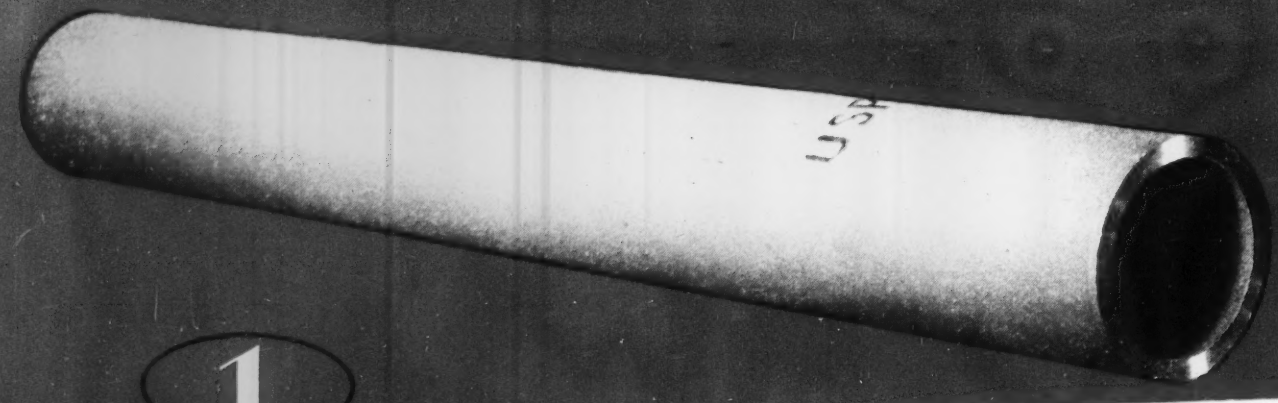
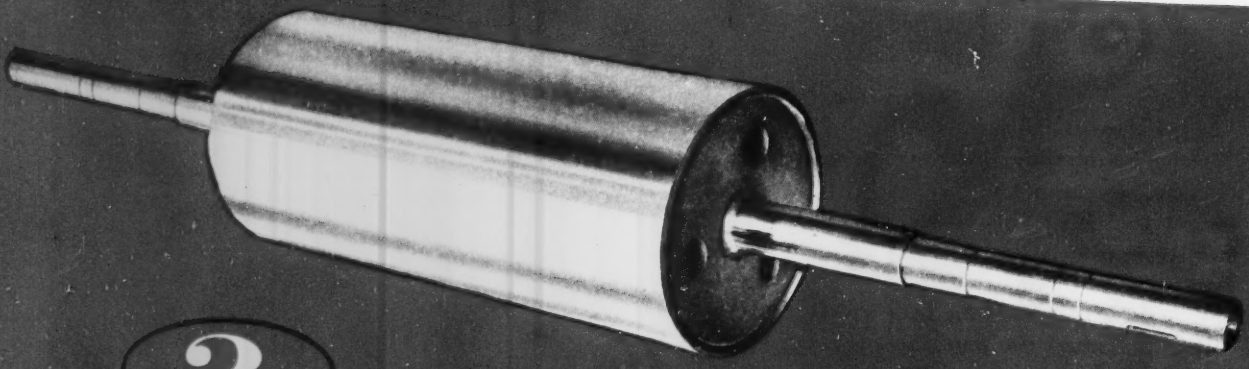
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY



1

TWO SOLUTIONS TO THE CHALLENGING PROBLEMS OF



2

UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, CAMBRIDGE (MASS.), BURLINGTON

HIGH TEMPERATURE

SOUNDNESS AT 2150° F.

1 Because of their inherent soundness, metal mold centrifugally cast retorts give longer operating life at extreme temperatures. These retorts have been tested in service under the most adverse operating conditions, and field performance data prove their superiority conclusively.

Centrifugally cast stainless steel retorts are used by the New England Lime Company of Canaan, Connecticut to produce high purity magnesium metal by thermal reduction. Their retorts are operated 24 hours a day at 2150° F. under a high internal vacuum — a test only the ultimate in soundness and quality could survive.

SURFACE AT 1400° F.

2 The Selas Corporation of America, one of the nation's leading industrial furnace builders, demands a high order of quality in the stainless steel rolls used in their continuous strip annealing furnaces. Perfect roll surfaces are a "must". The slightest surface imperfection in the strip will cause rejection.

Long, trouble-free life, at extreme temperatures, is assured because of the dense, flawless roll surface made possible by the metal mold centrifugal process.

In cylindrically shaped sections, U. S. Pipe offers a wide range of sizes in electric furnace alloys for many difficult and exacting applications.

"METAL MOLD" CENTRIFUGAL CASTINGS

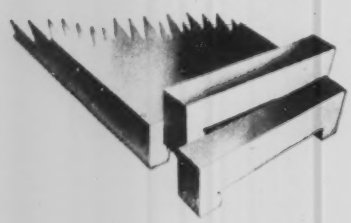
SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter	4" to 30"
Wall Thickness	⅜" and up
Length	Up to 14' in the "as-cast" condition
Type of Stainless Cast	All Standard AISI and ACI grades of ferritic and austenitic stainless plus "Special" types

HOW HARD are OK hardened ways?

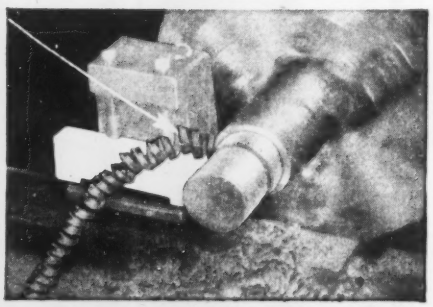
ONE CUSTOMER SHOWED US BY:

Taking a section from an OK bedway



Making it into a "tool bit"

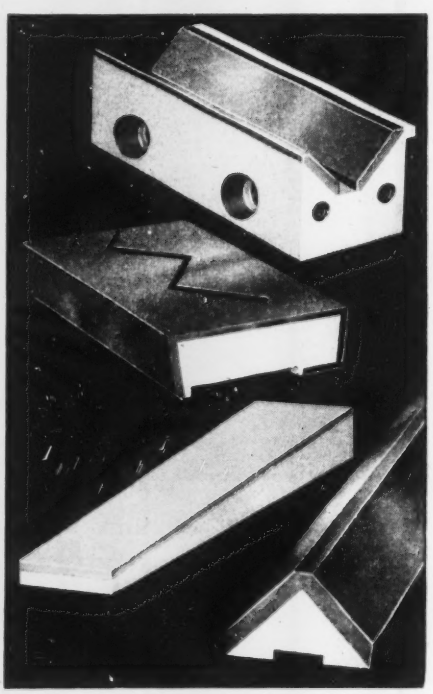
Then cutting metal with it (1045 cold rolled steel)



The Gisholt Machine Co., Madison, Wisconsin, who use Ohio Knife bedways exclusively on their ram and saddle type Turret Lathes, made the above dramatic test for one of their customers. RESULT—another sale of a famous Gisholt Turret Lathe.

This super uniform hardness on the wear surfaces to a depth of 3/16" (64-66 Rockwell "C") is the reason why more and more OK ways, gibs, races, etc., are being specified on new equipment and used as replacements where former parts have failed. OK ways are practically wear proof assuring constant accuracy throughout the life of your machine. Enjoy with many prominent machine tool builders and users, the long wearing, supreme accuracy, super hardness of OK ways. Many sizes, shapes, etc., available, or made to your specifications.

OK wear strips are now available in welded Ampco bronze.
(Reg. U. S. Pat. Office by Ampco Metal Inc.)



Manufacturers for the Metal Working Industry of:

SLITTER KNIVES • SHEAR BLADES • ROTARY SHEAR KNIVES
HARDENED SPACERS • HARDENED WAYS • GIBS
BALL RACES • BRONZE WAYS • WEAR STRIPS

Write for comprehensive Bulletin to Dept. C

GO WITH OHIO GREEN

THE OHIO KNIFE CO.

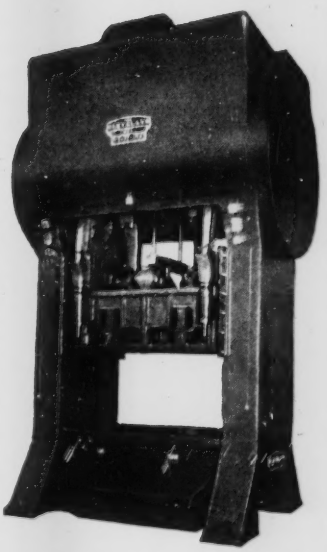
CINCINNATI 23, OHIO

PURCHASING

has competition got you worried?

THEN take a good look around your plant! Study your machinery production records! You may need to weed out and replace costly over-age equipment that's often down for repairs and adjustment, for your best answer to stiffening competition is utmost machine efficiency. Presses are no exception!

If you use presses, let a Cleveland Engineer show you how rugged Cleveland Presses will improve your operating economy. Available in a complete selection of types and sizes, modern Cleveland Presses feature *sturdy frames, extra long gibbing* and the revolutionary *Cleveland (patented) Drum Type Friction Clutch*. Write or call today!



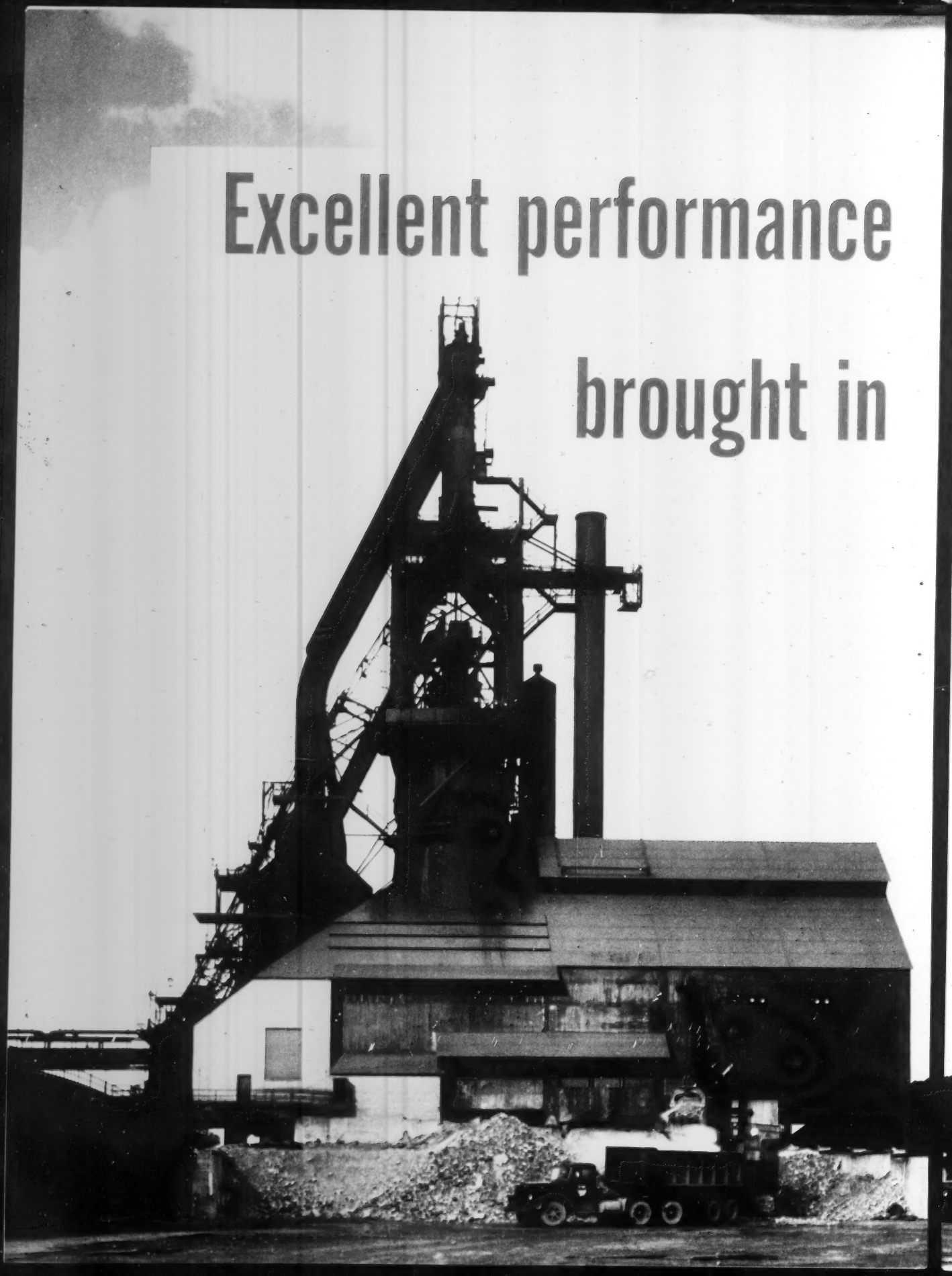
THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

CLEVELAND 14 • OHIO

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING

Excellent performance brought in



# of this new blast furnace

a *repeat order!*

FREYN Department of Koppers Company designed and erected Blast Furnace "D" for Great Lakes Steel Corporation of Detroit. It was blown in on September 22, 1952. Its hearth diameter is 28 feet.

Rated at 1,400 net tons of pig iron daily, this Freyn-Design Blast Furnace, from January 1 through May, had an average daily production of 1,501 tons – 107 per cent of rating. The ore charge was, if anything, below average quality and no sinter was used. Nor was the furnace heavily "scrapped" – less than 6 per cent of the output came from scrap charged.

Such performance can be attributed, in large measure, to a combination of fine equipment, skillfully devised lines developing unusually large relative working volume, plus a highly competent scheme of charging which was selected by the operator.

Great Lakes Steel has just ordered a new Freyn-Design Blast Furnace – a duplicate of "D" whose excellent performance led to the placing of this repeat order.

Constructing blast furnaces is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers. You are invited to consult with our Engineers and Management.

KOPPERS®

Engineering and Construction Division

KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

Wonder chemical

CHANGES METAL SURFACES, MAKES PAINTED PRODUCTS *look better longer*

NOT ALL "wonder chemicals" are new! Here's one that for more than a score of years has been doing a job that manufacturers at first said couldn't be done.

In as little as sixty seconds, Bonderite changes the surface of metal parts to a *nonmetallic* layer of unusual properties. Bonderite is used on automobile bodies, refrigerator cabinets, transformers, hardware, and metal furniture, to name a few items out of thousands.

This nonmetallic coating does several amazing things. Because it has an affinity for organic coatings and is integral with the metal, it takes and holds paint securely, preventing chipping and peeling. It acts to keep moisture from reaching the metal, thus controlling rust and corrosion. And should the paint film be damaged by accidental scratch or dent, Bonderite prevents the spread of finish failure.

All of these benefits combine to mean lasting fine appearance for those thousands of products whose manufacturers use Bonderite before painting.

Unlike many "wonder chemicals," Bonderite requires no special handling. It produces excellent results in large and small installations, in spray and immersion applications, and on steel, aluminum, zinc, or cadmium and their alloys.

The cost of Bonderite is small—a fraction of a cent per square foot of area treated—and the benefits are great.

Your inquiry will get prompt, expert, helpful attention.

*Bonderite, Bonderlube, Parco, Parco Lubrite — Reg. U.S. Pat. Off.

Parker

RUST PROOF COMPANY

2158 East Milwaukee, Detroit 11, Michigan

BONDERITE corrosion resistant paint base

BONDERITE and BONDERLUBE aids in cold forming of metals

PARCO COMPOUND rust resistant

PARCO LUBRITE wear resistant for friction surfaces

Treadwell

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.

Beds, Cooling
Beds, Inspection
Bumpers, Furnace

Pushers, Furnace
Repeaters

Handling Equipment (Kick-offs, Pilers, Cradles, etc.)

Steel and Iron Castings
Ni-Hard and Ductile Iron Castings

FURNACE CHARGING MACHINE

The illustration is operating on what is probably one of the largest re-heating furnaces in operation, heating blooms up to 16" x 16" x 16' long with a furnace hearth length and charging space 110' long.

BETTER GRADE MACHINERY

Treadwell Engineering Company

Easton, Pennsylvania

SALES AND ENGINEERING OFFICES

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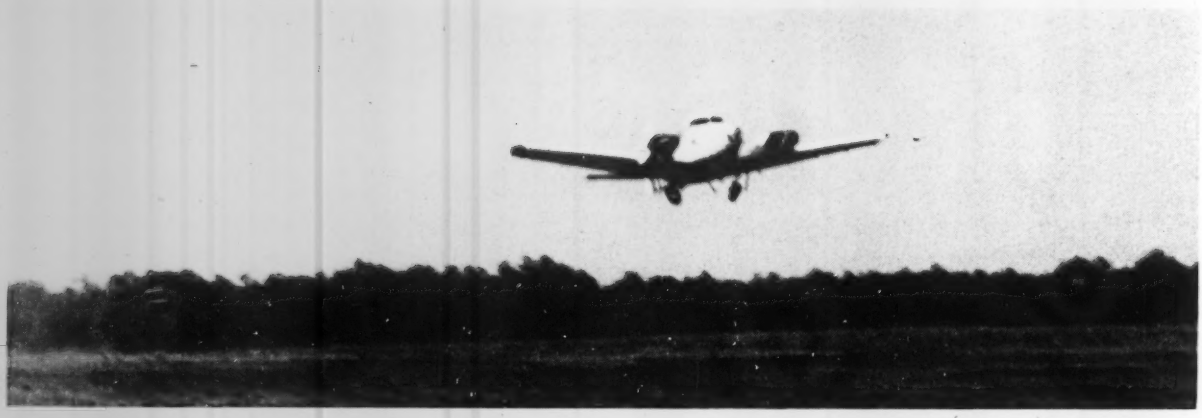
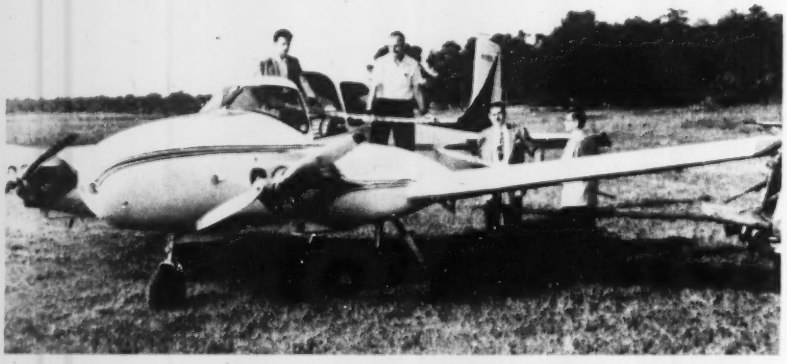


EMERGENCY "AIRLIFT" KEEPS 1500 AT WORK

BRISTOL, CONNECTICUT: Responding to a special appeal from an electrical manufacturing plant facing shutdown because of an unexpected failure in supply of critical material, a local brass mill flew to the rescue both literally and figuratively.

On Thursday afternoon the General Electric Company's plant in Somersworth, New Hampshire, suddenly found itself on the point of having to lay off many or all of its people because of non-delivery of a limited amount of nickel silver flatwire, made to extremely close dimensions and temper, and used in the manufacture of many small parts.

In exactly 5 days, including the week end, The Bristol Brass Corporation produced and delivered enough *brass* flatwire to meet these difficult specifications. On the following Tuesday the brass mill's truck transferred the wire to the mill's new Twin Navion plane at Bristol Airport, and less than 1 hour later the plane "delivered the goods" in New Hampshire.

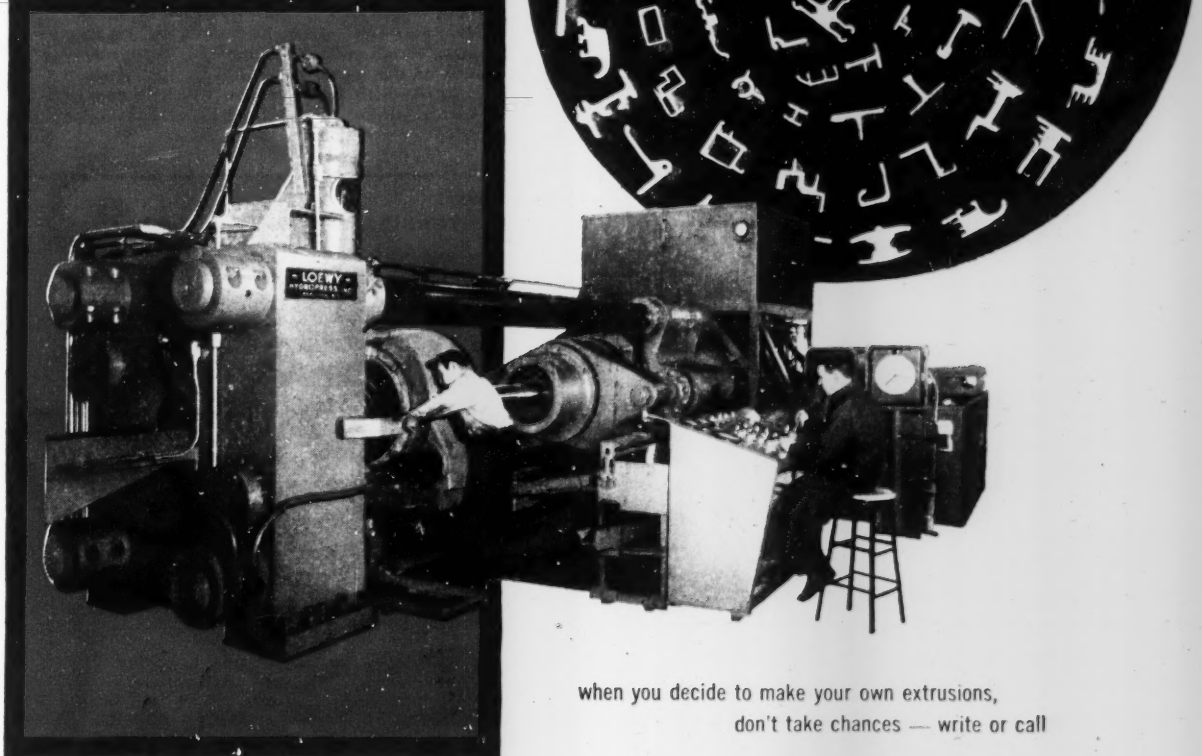


General Electric's Somersworth plant management was impressed with the speed and resourcefulness with which the crisis was met and overcome by a relatively small supplier with experience and flexibility to move fast in an emergency. Well known for such service to many manufacturers throughout the country, THE BRISTOL BRASS CORPORATION has been making brass sheet, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21.

"Bristol-Fashion" means **Brass at its Best**

LOEWY—HYDROPRESS
FIRST IN EXTRUSION

Recognized as the pioneer in the field
Forty years' world-wide experience in Extrusion Press design and engineering
Builder of the greatest number of Extrusion Presses — more than any other firm in this country
Supplier of the leading light metal producers, extruders and of the United States Air Force
First and outstanding in semi-automatic oil-hydraulic self-contained Extrusion Presses



Loewy-Hydropress Extrusion Presses are of the most advanced design and made for

- Easy and fast operation
- Minimum personnel and floor space
- High versatility and low maintenance costs

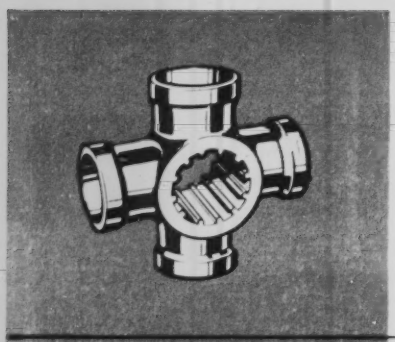
Loewy-Hydropress Oil-Hydraulic Self-Contained Extrusion Presses are built in capacities from 600 to 3000 tons

when you decide to make your own extrusions, don't take chances — write or call

LOEWY HYDROPRESS INC.
ENGINEERS • CONTRACTORS

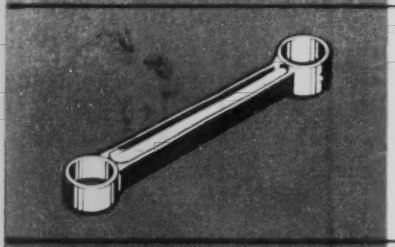
Rolling Mills • Hydraulic Presses • Pipe Testing Machines • Special Pipe Mill Equipment • Accumulators • Pumps • Die Casting Machines

350-A Fifth Avenue, NEW YORK 1, N. Y.



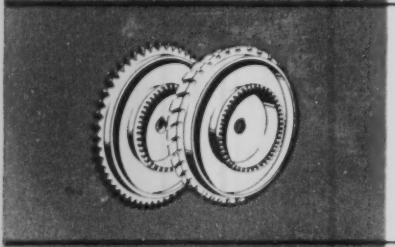
DETROIT BROACH TOOLS PROPELLER HUBS

Detroit Broach tooling for aircraft engine parts began with reciprocal engine designs. A typical example was the Detroit Broach tooling to produce the spline inside propeller hubs. In one pass, broaching produced a complete spline with consistent accuracy. This led to more accurate spline broaching in many other fields, too.



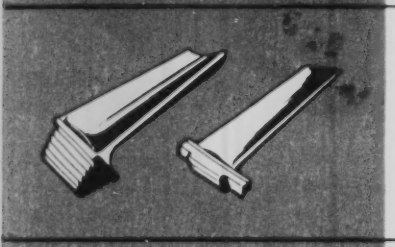
DETROIT BROACH TOOLS ARTICULATING RODS

As radial engines came to the forefront, new challenges in precision tooling were met by Detroit Broach ingenuity. Typical of reciprocal engine parts broached were articulating rods. Detroit Broach tooling produced a better finish and greater accuracy on the machined surfaces of these parts.



DETROIT BROACH TOOLS TURBINE AND COMPRESSOR WHEELS

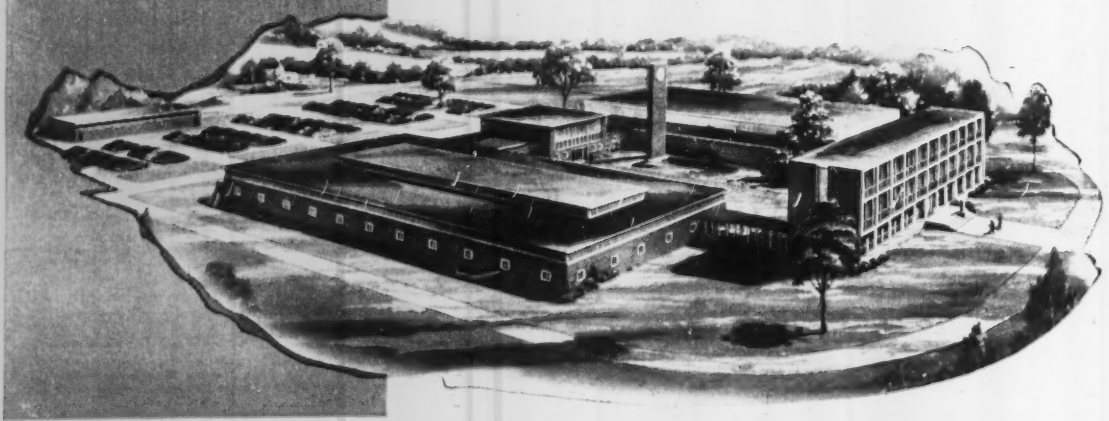
With the advent of jet engines, the need for close-tolerance repetitive accuracy was even more acute. In addition came the problem of working with high-alloy, heat-resistant, tough-machining metals. Compressor and turbine wheels are typical of the parts for which Detroit Broach tooling is meeting all requirements with flying colors. Varied forms of slots are produced in these wheels, square, at helix and at conical angles to the axis.

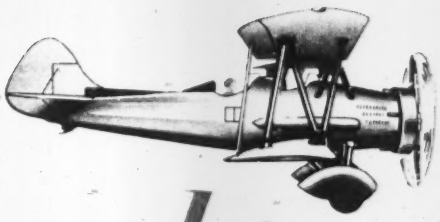


DETROIT BROACH TOOLS TURBINE AND COMPRESSOR BLADES

Mating parts to compressor and turbine wheels, the compressor and turbine blades are two more parts on which Detroit Broach tooling turned the trick. Intricate "Christmas Tree" forms, dovetail and "Ball Root" forms are easily produced with accuracy. At the same time, production costs are rock-bottom and surface finishes generally need no further machining.

This is a view of the new, ultra-modern Detroit Broach plant and offices located in Rochester, Michigan—just outside Detroit. Designed by Sture Frolen, eminent Swedish architect, it embodies many important advancements that contribute to employee morale and manufacturing efficiency. Another example of the unusual facilities of Detroit Broach Company.





Broaching Pioneers

IN THE AIRCRAFT INDUSTRY

Since the price of poor fits on engine parts may be paid in human lives, the aircraft industry was quick to recognize and adopt the inherent accuracies of broaching.

It was quick, too, to recognize the ability of Detroit Broach to engineer and produce tooling that met the need for concise repetitive accuracy . . . tooling with important production economies as shown on the opposite page.

in YOUR industry, too you will find many examples of Detroit Broach tooling that is producing repetitive accuracy, part after part after part. Just as important, it is tooling that consistently makes good common sense in terms of efficient operation and rock-bottom cost-per-piece broached.

These benefits that accrue Detroit Broach customers are not achieved by magic or by gift. They are the result of years of specialization in one important field . . . broaching. Every person, every machine, even plant facilities at Detroit Broach are geared to that single purpose.

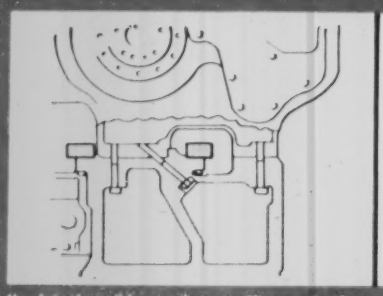
In broaching it will pay you, too, to have a talk with Detroit Broach Company . . . pioneers in broaching yesterday, today, and tomorrow.

Detroit Broach COMPANY

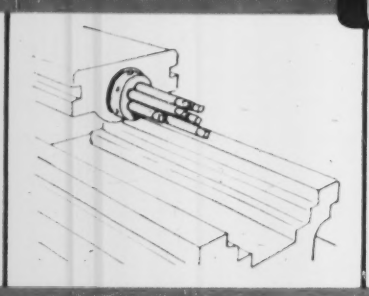
ROCHESTER, MICHIGAN

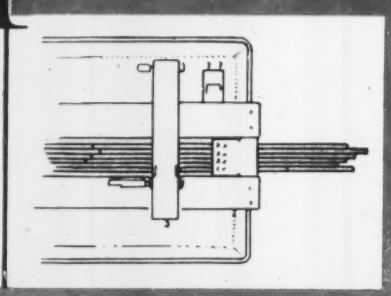
OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

another reason why J&L turret lathes produce { *MORE CHIPS PER TOOL*
MORE PIECES PER HOUR
MORE PROFIT PER JOB

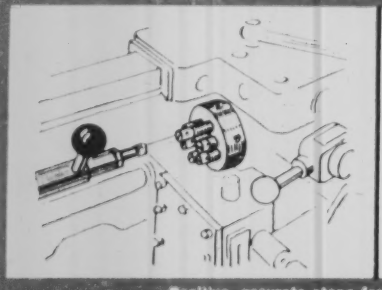


Headstock, solid one-piece casting—extra heavy sections. Wide stable bed. Hardened and ground steel ways.

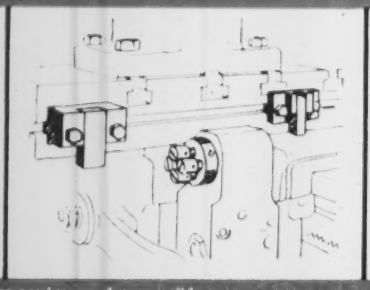


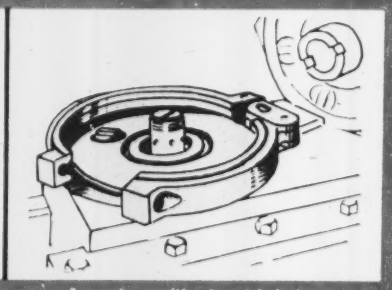


Positive, accurate stops for hexagon turret.



Positive, accurate stops for carriage and cross slide.





Accurate, positive turret indexing.

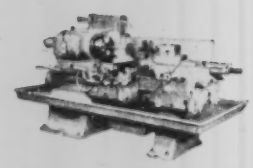
MORE ACCURACY!

The headstock is cast separately in one piece, with extra heavy sections to dissipate heat and minimize distortions. Bed is a heavy sectioned casting, with shoulders the full length for accurate alignment of the ways with the headstock.

The replaceable hardened solid steel ways are precision ground—parallelism is held to .0003 in both width and thickness, their entire length. All cuts (within rated capacity) taken on or between bedways.

All feeds are disengaged against easily set positive stops, through positive metal-to-metal contact.

Turret rotates on hardened, ground and lapped center pin—bearing surfaces are hand scraped. Locking pin and bushing provide solid, flat abutments with maximum contact area.



P.S. *These machines will pay for themselves quickly through savings in direct costs alone. Write to Dept. 710 for Catalog.*

"World's most accurate and powerful turret lathes"

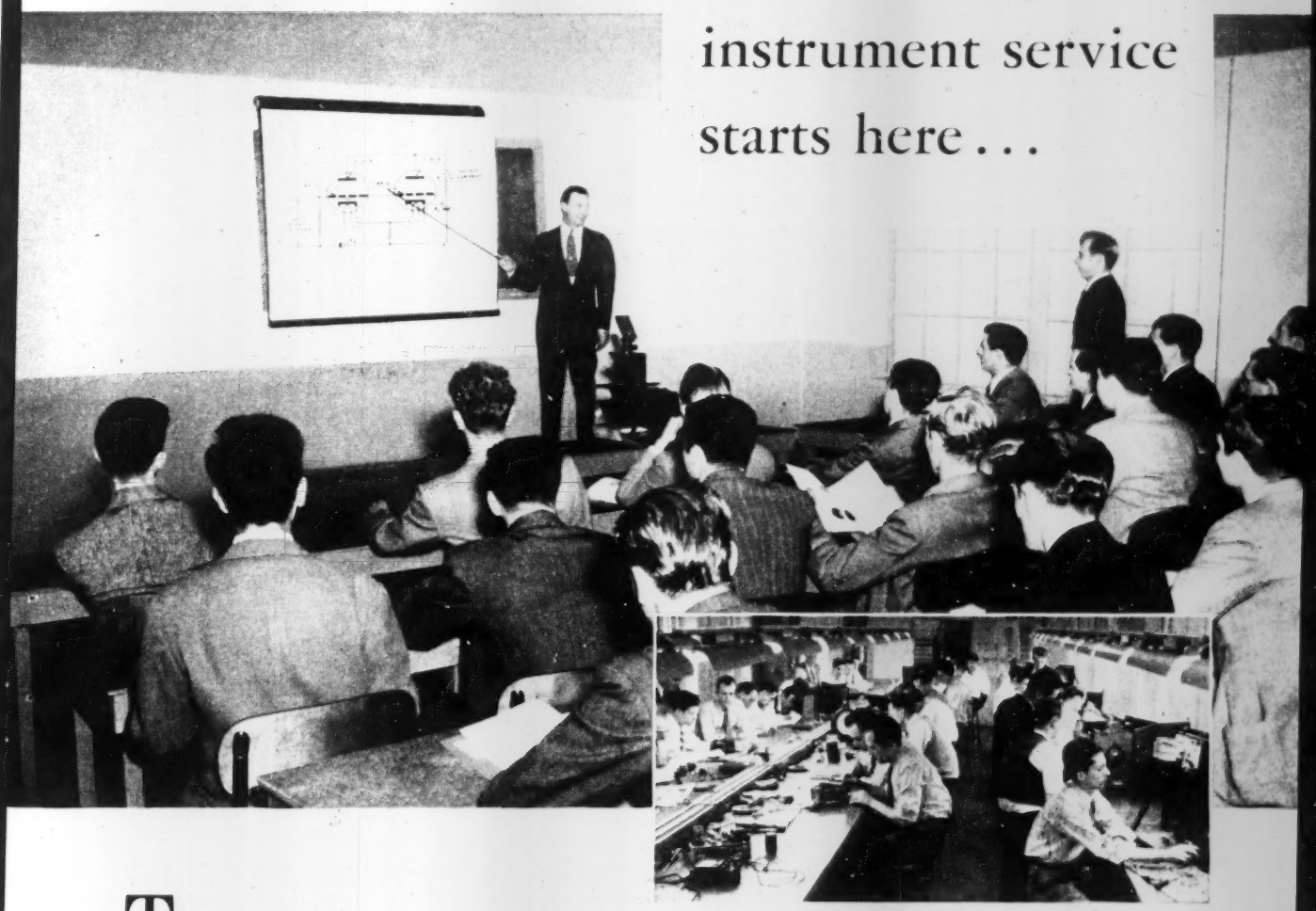
RAM TYPES: Bar, 1½" to 4½", Chuck, 10" to 12". SADDLE TYPES: Bar, 2½" to 5", Chuck, 12" to 18".

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L TURRET LATHE DIV.

Your Honeywell instrument service starts here...



THOROUGH TRAINING is the foundation of Honeywell instrument service. In classrooms and in the Honeywell factories, hand-picked men first are schooled in both the theory and practical art of keeping good instruments in the best condition.

Then they serve an apprenticeship in field work . . . learning still more through first-hand experience. The Honeywell service man who comes to your plant is a full-fledged specialist, well equipped to render the service you need . . . and that your Honeywell instruments deserve.

These men are part of the world's largest instrument service organization. They're at your call in more than 110 Honeywell offices, located near every major production center from coast to coast.

When trouble occurs, just pick up your phone and one of them will get to your plant promptly . . . within a few hours. But to prevent troubles before they start, investigate Periodic Instrument Service . . . an economical plan that assures your instruments of regular check-ups by a capable service man.

Honeywell's service school training is also available, at no charge, to employees of customers.

Your nearest Honeywell office will gladly give you full details about Honeywell instruments, controls . . . and service.

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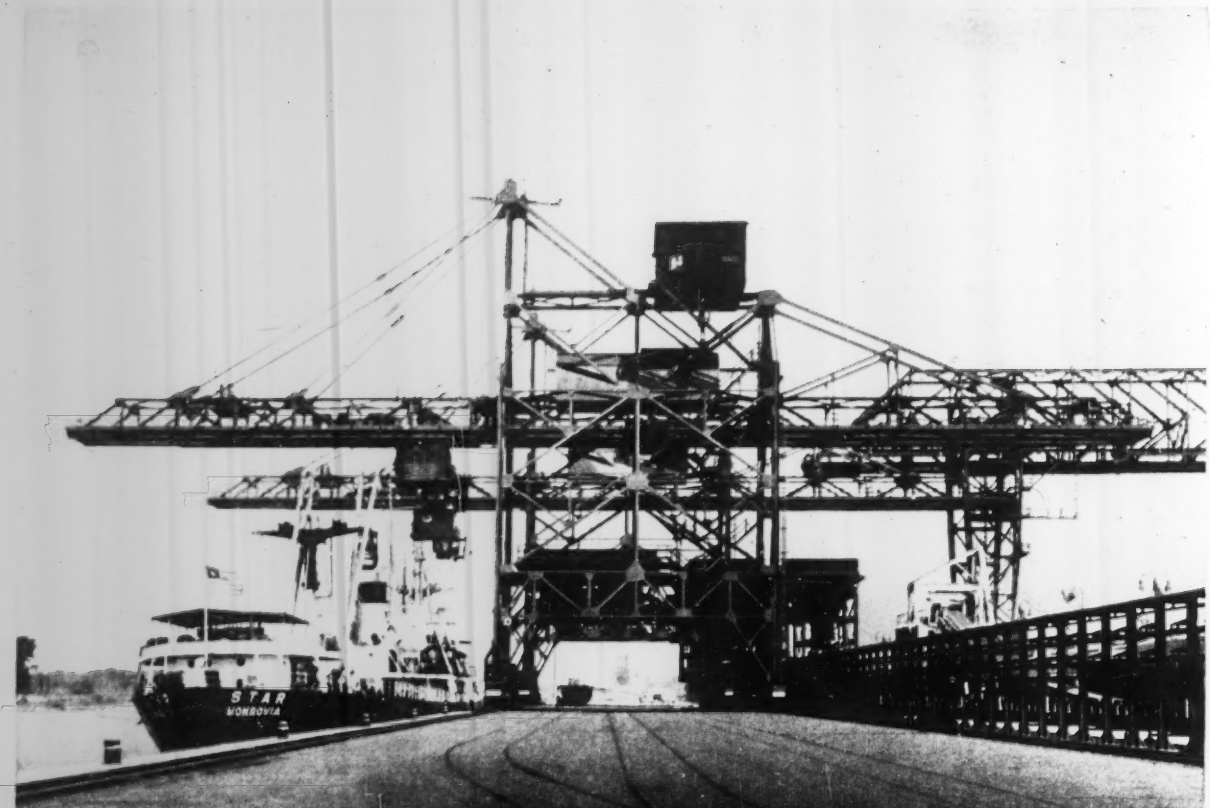
MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls



These two man trolley type unloaders, built by Dravo Corporation, are part of the materials handling equipment at the dock of United States Steel Corporation's new Fairless Works near Morrisville, Penna.

The two unloaders run parallel on a common runway for a distance of 1,000 feet. Each unloader is built to handle a 200-cu. ft. ore bucket or a 300-cu. ft. coal bucket. Coal or ore can be unloaded to railroad cars, to pit storage or to a conveyor belt.

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MODERNIZED TROLLEYS FOR EXISTING BRIDGES

Why not make use of Dravo's more than 60 years of practical experience in the engineering field when planning your next heavy materials handling project?

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J&L's new JALTEN series replaces the famous Otiscoloy Line and may be selected in the following combinations of advantages:

Jalten No. 1—High strength, good formability and fabricating, good low temperature impact resistance.

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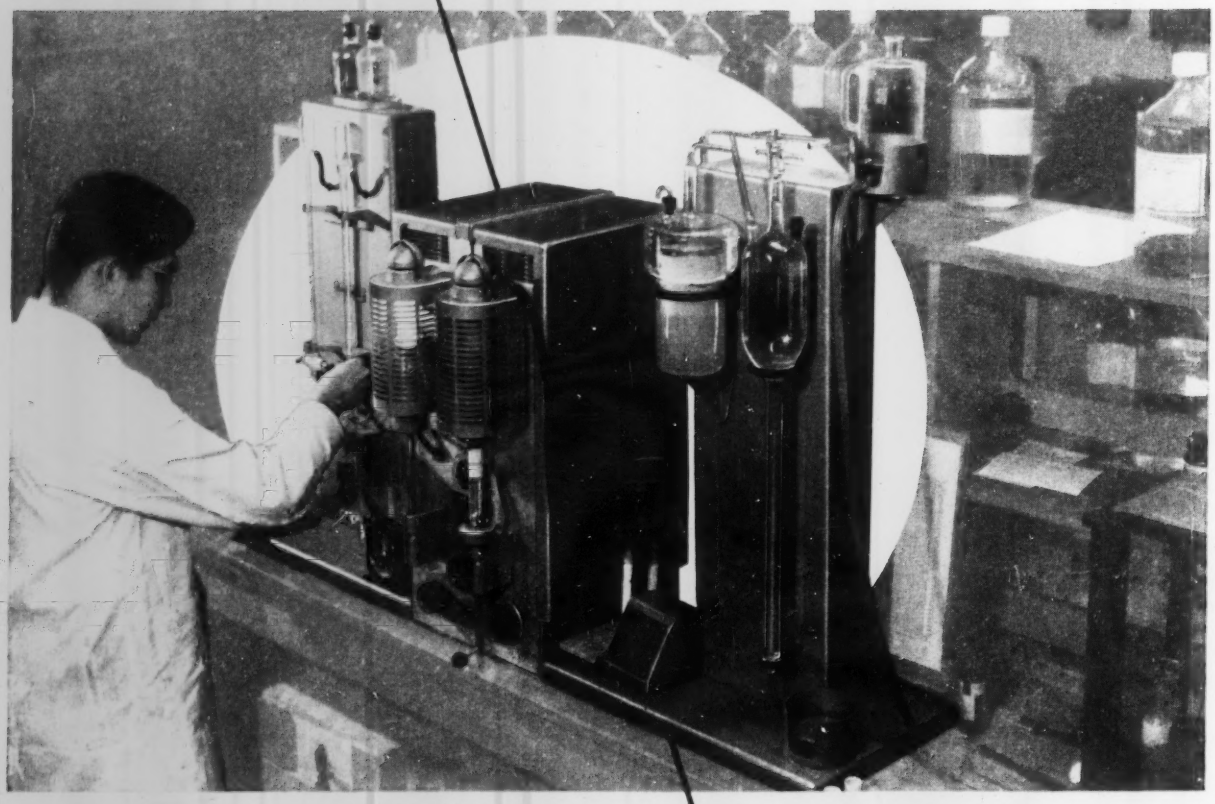

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In New York City, a Lindberg *two-station* High Frequency Combustion Unit . . along with a Lindberg Volumetric Carbon Determinator and a Lindberg Sulfur Determinator is used in varied types of ferrous analyses by Sam Tour & Company, Inc., one of the nation's leading commercial testing laboratories.

Hundreds of laboratories . . commercial and private . . have installed Lindberg High Frequency Combustion units *for the ignition of iron-steel samples in carbon and sulfur determinations.*

Here are some of the reasons why you will select Lindberg equipment:

- *Both* carbon and sulfur can be analyzed with the same unit.
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- Only samples are heated . . no excess heat in laboratory . . no elements to burn out.

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Fuzzy production problems shape up nice and square when the Republic Field Metallurgist and the Republic Mill Metallurgist and the Republic Laboratory Metallurgist all put to work their combined knowledge of alloy steels and heat-treatment and machining. Scores of Republic customers are making better products at greater rates and lower cost because they called in a Republic Field Metallurgist. It may be an idea *you* could use to your benefit!

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NOW, Lincoln joins *powdered metal* with the electrode to utilize the heat of the arc more efficiently . . . to achieve fastest hand welding speeds ever accomplished . . . with new quality standards.

Jetweld is a shielded-arc type electrode designed for fast, easy operation with AC or DC. Powdered metal in the coating makes welds amazingly crack resistant, provides extra impact properties not found in conventional E-6012 electrodes. Welds compare in appearance with "hidden-arc" welds.

Operators like Jetweld for its smooth, stable arc action . . . its remarkable improvement in resistance to arc blow. Spatter is practically nil . . . welds are self-cleaning. Bead shape is flat.

Jetweld is designed for horizontal and flat position fillets, horizontal and flat position laps, single and multiple pass butts. It meets the physical requirements of a class E-7016 electrode and is used on work formerly calling for E-6012 and E-6020 electrodes.

JETWELD cuts deep into the 86¢ out of every welding dollar that goes for labor and overhead . . . can save you $14,190 per carload. Here's why:

FASTER WELDING—Jetweld's higher deposition rate now makes it possible for you to save enough money to warrant scrapping existing supplies of conventional E-6012 electrodes. Easier to restrike when cold, Jetweld simplifies tack welding. Simple to operate . . . Jetweld is a "drag" electrode with exceptionally stable arc characteristics.

HIGHER QUALITY—Weld metal is uniform, of X-ray quality, free of undercut with improved impact values at low temperatures. Jetweld is ideally suited for welding higher-carbon steels normally welded with low-hydrogen electrodes . . . without cracking and without surface holes There is no coating breakdown . . . stub losses are less.

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ACTANE 33 — A crystalline product that replaces hydrofluoric acid for many operations — etching, bright dipping of aluminum. Also used in pickling stainless steel and removing silica. Less hazardous to handle than HF.

COMPOUND NR-28 — A very effective water soluble rust inhibiting compound for steel. Neutral in reaction. A powdered material used 1 - 2 oz/gal.

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DESCALER 2A — A powdered acidic compound added to water to make pickling solutions for iron and steel. Safer to handle than sulphuric acid. Gives controlled acidity to prevent overpickling. Contains surfactants to promote more uniform and cleaner pickling.

ENAMEL STRIPPER 95 — An emulsifiable solvent type stripper for uncured lacquers and enamels. Can be used for stripping uncured materials from defective work and is also used for cleaning of spray paint booths and spray equipment. Overcomes hazards of the use of thinners for cleaning purposes.

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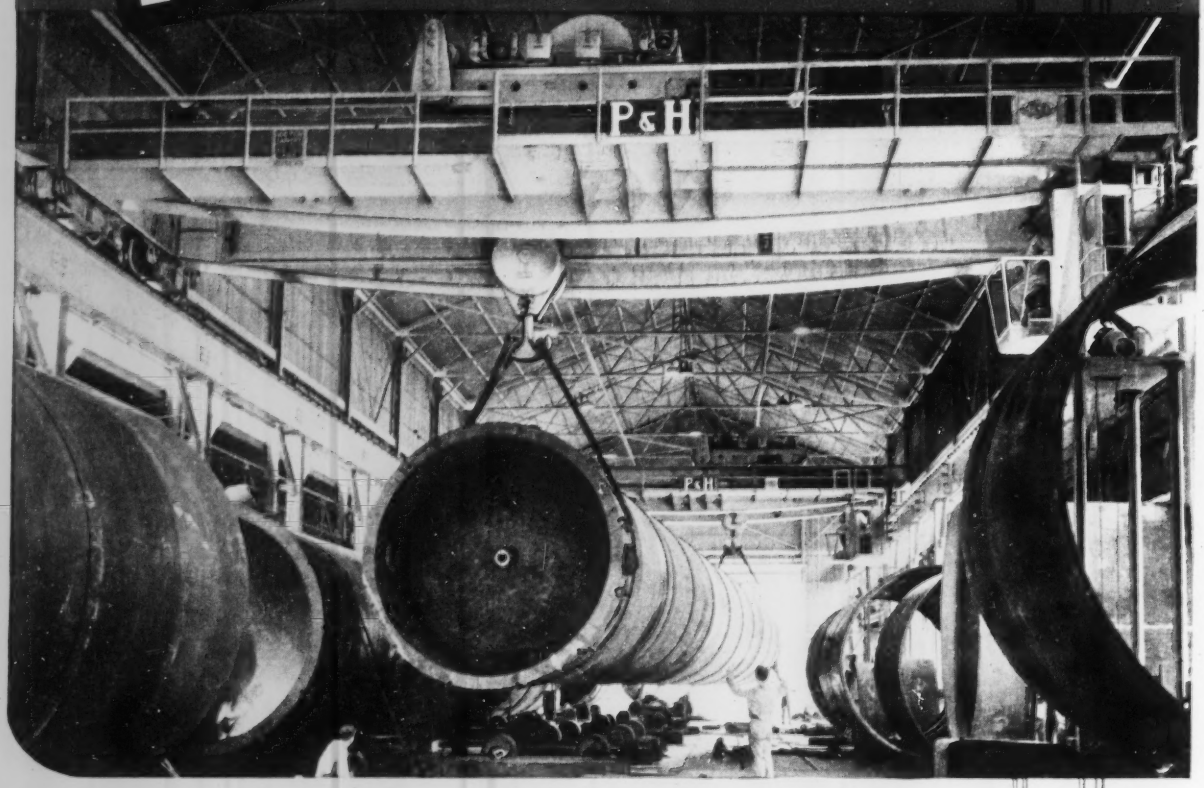
P&H OVERHEAD CRANES



Why P&H builds the entire Crane

. . . including electrical equipment!

If you want the utmost in service from your cranes, insist that they be job *engineered* by P&H — not an assembly of components from various sources. For example, general purpose electric motors don't stand the gaff of crane service like those *designed* for the job. That's why P&H builds its own motors, brakes and controls — with all characteristics *properly suited* to crane operation: P&H electrical equipment throughout is your assurance that all functions are perfectly coordinated. It means better service, less maintenance.

This policy of complete quality control — of single manufacturing responsibility — better service — made P&H the leading builder of overhead traveling cranes. Continuous improvement, far ahead of the field, has extended this leadership. Benefit by it when you buy your next cranes.

*T.M. of Harnischfeger Corporation for electromagnetic type brake.

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P&H OVERHEAD CRANE DIVISION

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P&H MAGNETORQUE* AC Crane Control is the most important development in crane service in 25 years.

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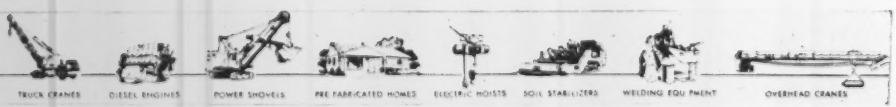
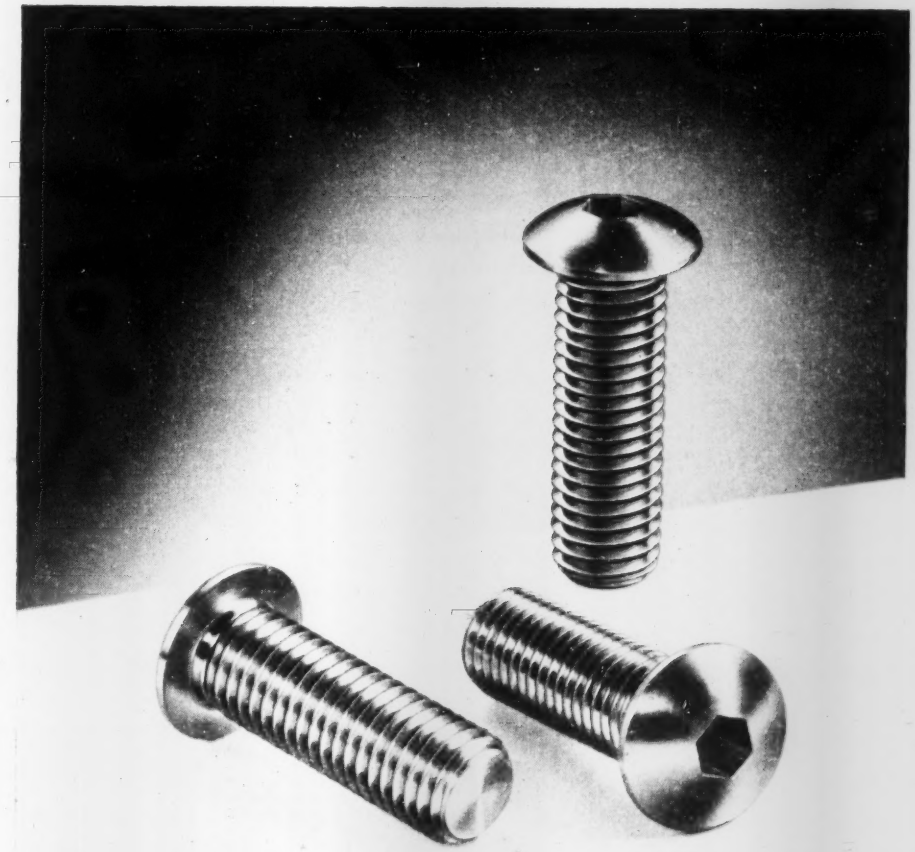
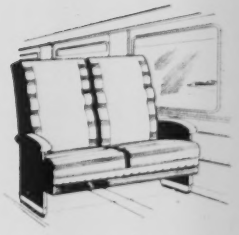


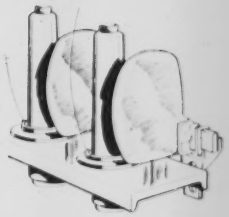
Our Fiftieth Year

A START FOR THE FUTURE

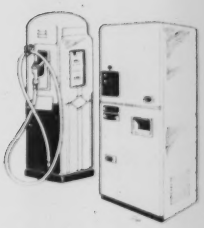




USE UNBRAKO BUTTON HEAD SCREWS on transportation equipment—door and window frames, paneling, seats.



On textile machinery—slashers, twisters, bobbin shields.



On sheet metal assemblies—beverage coolers, gasoline pumps.

UNBRAKO BUTTON HEAD SOCKET SCREWS feature the following: threads to head, low head height, nonslip internal wrenching; hex socket that minimizes possibility of marred or mutilated heads; fully formed threads—Class 3 fit; heat treated alloy steel; standard sizes from # 8 through ⅜" diameter.

Have you checked our UNBRAKO standards?

We suggest you do, because a standard UNBRAKO delivered from your distributor's stock means faster and better service. A standard will do the job as well as a special at much lower cost. For details about UNBRAKO Standards, write SPS, Jenkintown 33, Pa.

Write for UNBRAKO Standards

UNBRAKO® SOCKET SCREW DIVISION

SPS JENKINTOWN PENNSYLVANIA

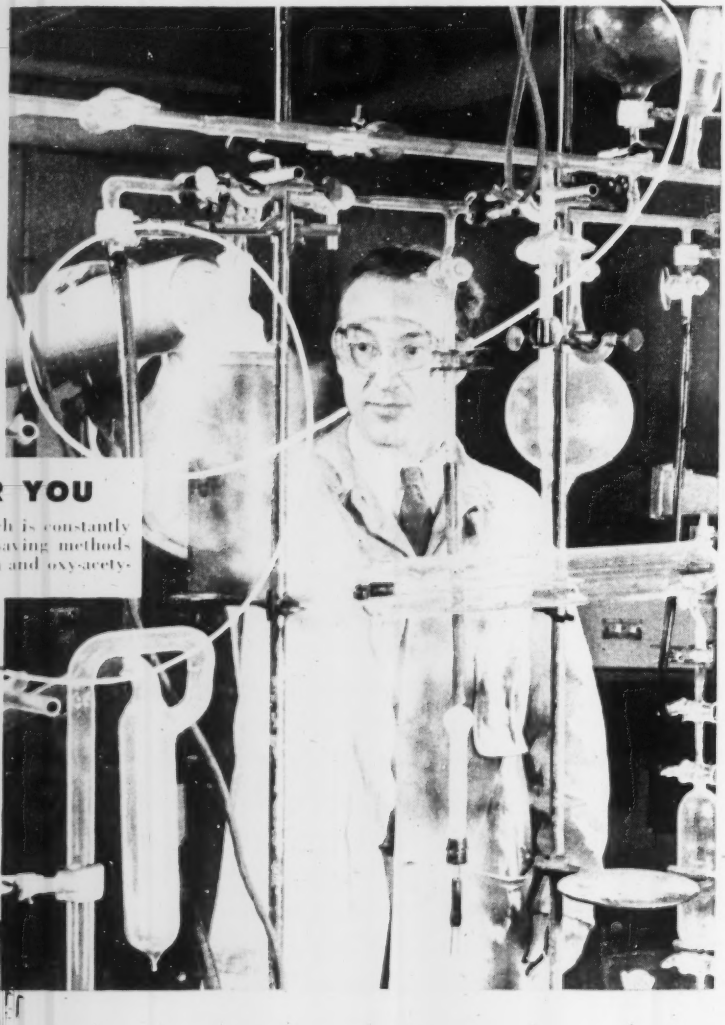
with LINDE Oxygen you get the BIG PLUS

. . . that's LINDE SERVICE

In every metalworking operation, new materials, changing requirements, and unexpected emergencies create special situations that demand skill and experience.

That's where LINDE SERVICE comes in. LINDE's field engineers stand ready to help you meet such conditions. They're backed by LINDE laboratories, where research in oxygen manufacture, distribution systems, and application methods has been carried on for more than 40 years.

When you use LINDE Oxygen, you're also getting, when you need it, practical advice and engineering service that can't be matched anywhere else.



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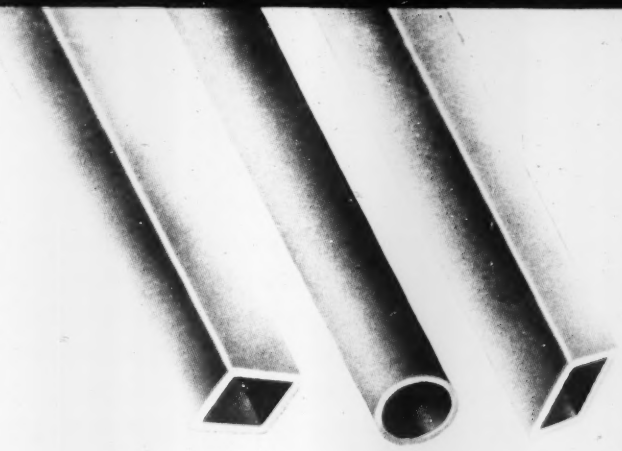

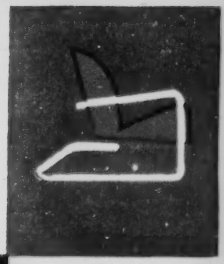

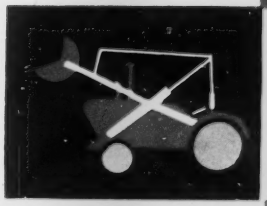

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IN A WIDE RANGE OF SHAPES, SIZES, AND GAUGES

Nikoh will design and produce the right tube for your needs . . . will help you cut costs, reduce weight, increase strength, and improve the appearance of your product. Nikoh Electric Weld Steel Tubing meets the most exacting requirements of government and industry . . . assures you uniformity, strength, precision, durability, and economy . . . provides proper tensile strength as required. Nikoh's experienced engineers are available to help solve your problems. Put Nikoh's complete facilities to work for you today.

Tubing is our product . . .
Service is our business.

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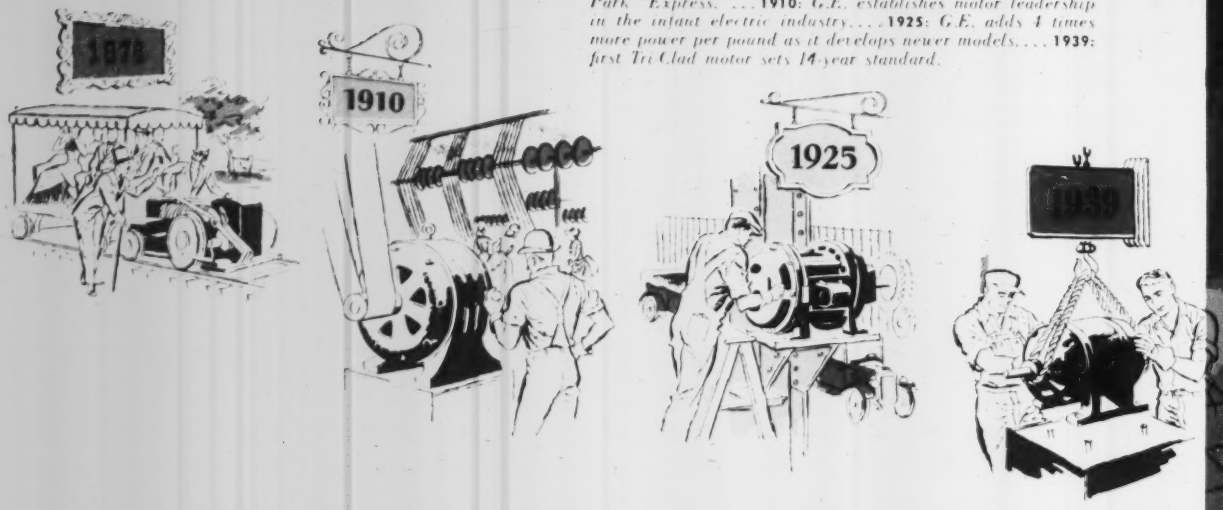
1878: *Thomas Edison builds an electric motor for his Menlo Park "Express."* . . . **1910**: *G.E. establishes motor leadership in the infant electric industry.* . . . **1925**: *G.E. adds 4 times more power per pound as it develops newer models.* . . . **1939**: *first Tri-Clad motor sets 14-year standard.*



General Electric Announces...

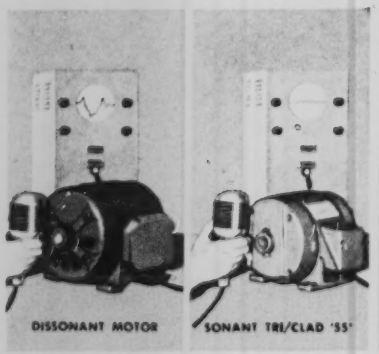
A NEW MILESTONE IN MOTOR HISTORY

New TRI CLAD motor climaxes 75 years of engineering leadership

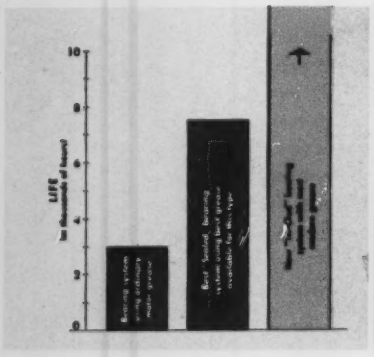
The General Electric Tri/Clad '55' is an important milestone in motor history. For this is a *completely new motor*. Born out of thousands of engineering man-hours, the Tri/Clad '55' incorporates design improvements that go far beyond mere modifications. Many years of pure research, the discovery of new, better materials, the knowledge of how to make better use of present materials, and improved manufacturing processes all make the Tri/Clad '55' motor the new leader in the motor field.

You as a motor user should take the opportunity to see and test this motor for yourself. Contact your nearest G.E. Apparatus Sales Office or G.E. Motor Agent and tell him you want to see the new G-E Tri/Clad '55'. General Electric Company, Schenectady 5, N. Y.

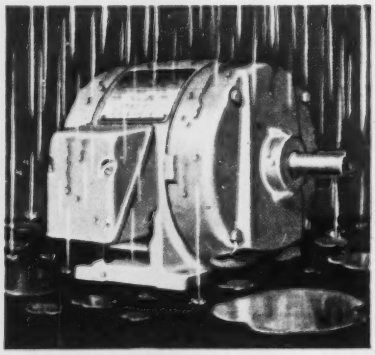
6-48-1



DESIGNED FOR BETTER PERFORMANCE: Tri-Clad '55' has a low noise level . . . runs cool . . . gives up to 5% increase in shaft output per pound . . . has higher full-load speeds.



ENGINEERED FOR LESS MAINTENANCE: 10%-life tests (such as the one shown) prove the Tri/Clad '55' bearings last longer without regreasing than any other bearing system.



BUILT TO LAST LONGER: cast-iron strength . . . more fully enclosed dripproof construction . . . water-shedding stator windings . . . polyester film insulation 8 times stronger.

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TRI-CLAD INDUCTION MOTOR
MODEL
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VOLTS
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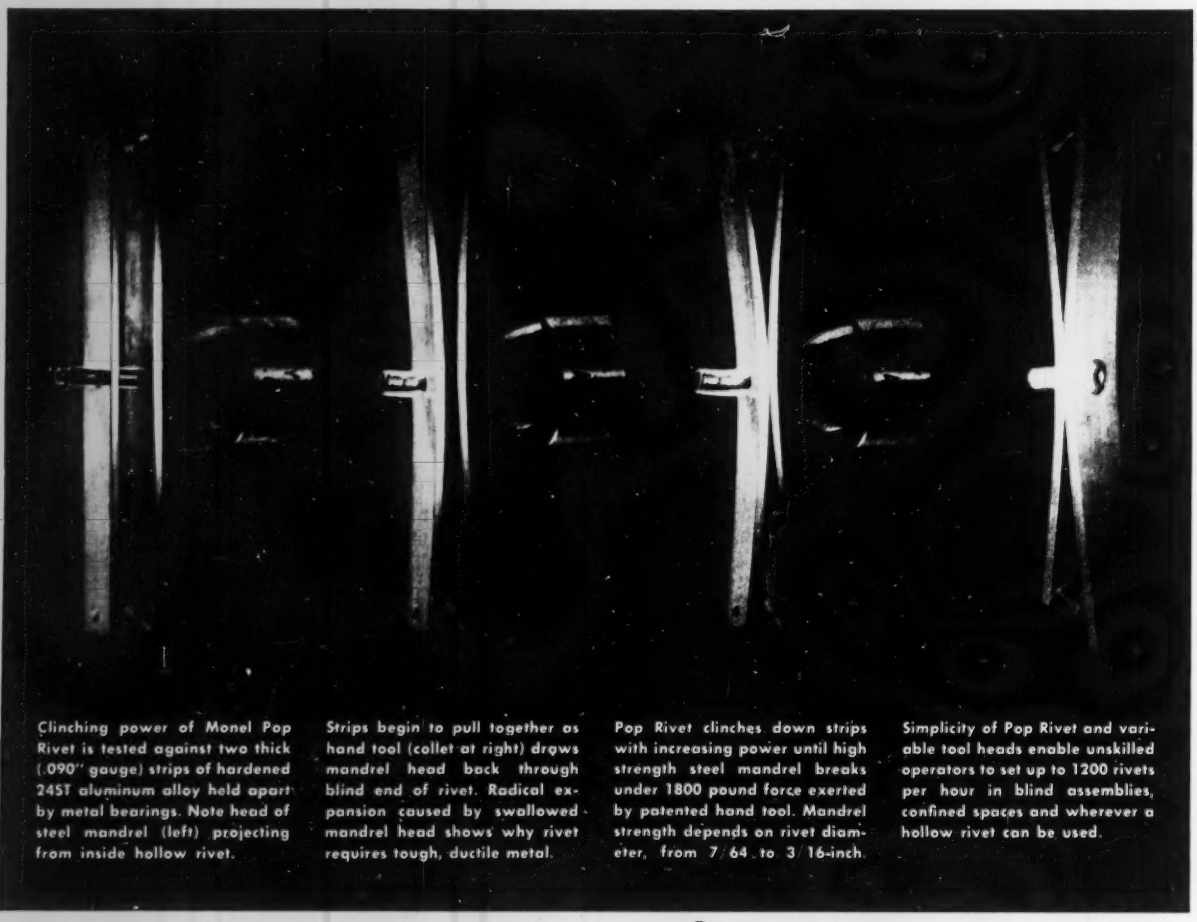
MADE IN U.S.A.
TRI-CLAD
THE LEADER IN MODERN MOTOR DESIGN
Progress is our most important product
GENERAL ELECTRIC



Clinching power of Monel Pop Rivet is tested against two thick (.090" gauge) strips of hardened 24ST aluminum alloy held apart by metal bearings. Note head of steel mandrel (left) projecting from inside hollow rivet.

Strips begin to pull together as hand tool (collet at right) draws mandrel head back through blind end of rivet. Radical expansion caused by swallowed mandrel head shows why rivet requires tough, ductile metal.

Pop Rivet clinches down strips with increasing power until high strength steel mandrel breaks under 1800 pound force exerted by patented hand tool. Mandrel strength depends on rivet diameter, from 7/64 to 3/16-inch.

Simplicity of Pop Rivet and variable tool heads enable unskilled operators to set up to 1200 rivets per hour in blind assemblies, confined spaces and wherever a hollow rivet can be used.

A blind rivet that may open your eyes

Maybe you have a product that isn't performing the way you want it to. And maybe your problem is to find the right metal.

The makers of "pop" rivets had just such a problem.

Here they'd come up with a wonderful idea — a rivet that could be set from one side of the work simply by yanking a steel mandrel through its hollow body. The "pop" rivet would do things no other rivet on the market would do so well, or so inexpensively. Still, it wasn't quite right for *every* job . . .

What they needed was a metal strong enough to clinch tightly and *stay* tight . . . ductile enough to "upset" and form a head properly . . . resistant enough to give the back of its hand to corrosives.

Of course, a single metal with all these advantages isn't too easy to find. The manufacturers had tried other metals before they tried Monel®. But they didn't have to try any others *afterward*. Monel was their answer: it had every characteristic needed.

Does this rivet maker's success open your eyes to a new possibility for solving some problem of your own by using Monel or another INCO Nickel Alloy? Let's work it out together.

The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.

"Pop" Rivets, long known as Tucker Blind Rivets in Great Britain, are now being produced in the U. S. for the first time by J. C. RHODES & COMPANY, branch of UNITED SHOE MACHINERY CORP., New Bedford, Mass.

Inco Nickel Alloys MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL • "S"® MONEL
INCONEL® • INCONEL "X"® • INCONEL "W"® • INCOLOY® • NIMONIC® ALLOYS
NICKEL • LOW CARBON NICKEL • DURANICKEL®

STEEL
November 16, 1953

Metalworking Outlook

Sad Tax Facts

Don't count too heavily on the scheduled corporate income tax drop taking effect as planned next April. It's supposed to drop from 52 per cent to 47 per cent. The U. S. needs the money, and present administration thinking is that the end of the excess profits tax Jan. 1 is enough of a tax concession to business. The 5-per-cent drop in the regular corporate income levy would cost the government an estimated $1.2 billion in receipts.

Senator Ives Steps In

There's greater chance for Taft-Hartley amendments being passed by the next Congress which are acceptable to labor leaders. That's because of the appointment of Sen. Irving M. Ives (Rep., N. Y.) as acting chairman of the Senate Labor Committee's subcommittee to study T-H changes. Senator Ives long has been a friend of organized labor and was instrumental in eliminating some drastic features from the original T-H bill, notably the one that would have outlawed union-wide, industry-wide bargaining.

Ford Makes a Shift

Quietly, Ford's special products operation has become a division of Ford Motor Co., with William C. Ford, vice president, as general manager. Ford has a revision of the Lincoln Continental and a sports car similar to the Chevrolet Corvette in the mill, as well as some European products like the Cis-Ford and the Comete, any one of which is a feasible undertaking for the new division. A whole new line of cars could even be in the offing since General Motors Corp. takes five and Chrysler Corp. four to cover the market. Ford's three may look inadequate as competition starts to squeeze.

Aircraft: Looking Up

In 1953 the aircraft industry will build about 12,000 military aircraft (more than half of them jets) and 4700 civil transports and utility aircraft, estimates Aircraft Industries Association. The industry currently produces more than $900 million worth of aircraft, engines, parts and propellers (including civil products) per month. In midsummer, the industry's order backlog totaled $18.9 billion. On the basis of that, the industry is assured of fairly high volume throughout 1954 and into 1955.

$250 Million for Tools?

Watch for the Department of Defense to announce soon its policy in buying stand-by machine tools. Congress appropriated it $250 million for that purpose for fiscal 1954. Because of the administration's economy drive, odds are that the department will dispense the funds with decided caution.

Chance for Saving

Defense department may also save some money on military construction. It's now about half way into a $9-billion building program begun in 1948. Of the total, about $5 billion has been appropriated for construction of Air

The Technical Outlook—p. 109 The Market Outlook—p. 169

Force bases and installations. The remaining $4 billion has been divided about equally between the Army and the Navy. Savings, if any, probably will come largely from the Air Force's share. Military installations are now on the books at an original cost exceeding $17 billion. In continental U. S., its territories and possessions the Army operates some 1145 installations, the Navy 741 and the Air Force 706.

Is the Sky the Limit?

A skyscraper building spree is changing the urban skylines from coast to coast, as commercial building soars. In October, it rose contraseasonally to a new peak of $179 million, up 71 per cent from the same month last year. About 100 big elevator-type office buildings have been built in the U. S. during the last five years, more than were put up in the previous 15. New York has built 28 new office buildings in the last five years, another 23 are under construction and still others are being planned. Washington has built 30 and Pittsburgh 5.

Electrifying Opportunity

An estimated 8 million homes need to be rewired today, and factory electrification requires modernization. Engineers estimate that adequate electrification is used for servicing only 24 per cent of the nation's homes, 21 per cent of the nation's manufacturing and only 19 per cent of the functions of commerce. Look for the next five years to see greater advances in industrial electrification than we have seen in the past 25.

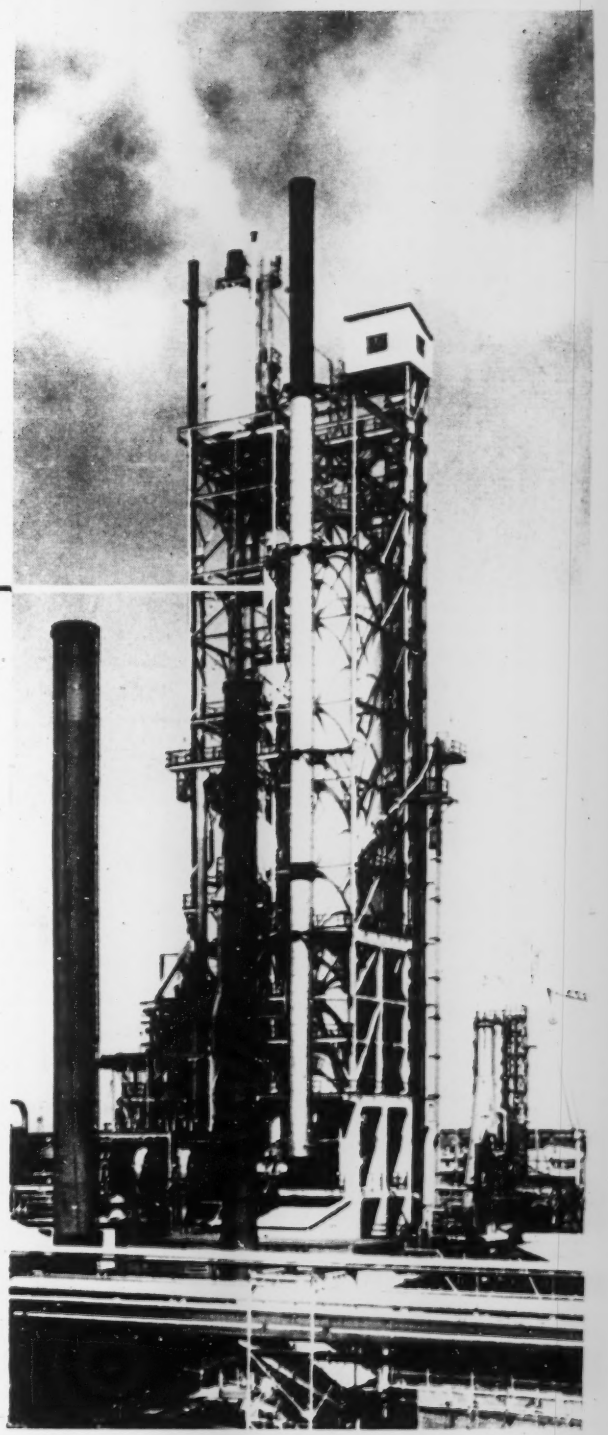
Straws in the Wind

Steel production totaled 9,459,000 in October and 94,969,617 tons in the first ten months, says American Iron & Steel Institute . . . Auto builders are driving sharp bargains, and stampers in that field are in a price squeeze as labor and materials costs remain high . . . The U. S. will charge higher fees for licenses, patents and trade marks . . . Westinghouse Electric Corp. has cut prices $30 to $40 on an automatic washer and clothes dryer . . . President Eisenhower has named Interior Secretary Douglas McKay, State Secretary John Dulles, Commerce Secretary Sinclair Weeks and Defense Mobilizer Arthur Flemming to draft a revised national policy on mineral resources . . . In the first quarter, 194 million pounds of aluminum has been set aside for defense, 41 million less than in this quarter.

This Week in Metalworking

Machine tool builders are optimistic despite a foreseeable business decline in 1954 (p. 69) . . . Rail freight rates are coming down, especially in the South, as railroads fight to be competitive with truckers (p. 71) . . . The U. S. is financially backing 47 per cent of the nation's industrial research (p. 72) . . . Hundreds of new applications are spurring air tool makers to drive for new markets (p. 73) . . . General Motors will buy Willow Run for $26 million (p. 75) . . . A wage incentive plan has been applied successfully to white-collar engineers at an Ohio tool and die plant (p. 80) . . . There's a trend toward stainless steel in the flatware industry (p. 81).

How Armco ALUMINIZED Steel Solved a Contraction Problem



An Armco ALUMINIZED Steel raincoat for a stack

Before this stack connected with a high-temperature fractionating column was sheltered by a rain-shield made of Armco ALUMINIZED* Steel, driving Gulf Coast rains were a serious hazard. The stack operated normally at 700 degrees F, but semi-tropical rains would cool the windward side down to 300 to 400 degrees F, while the lee side of the stack remained at operating temperature. Uneven contraction would cause the stack to bow.

SOLVED CRACKING PROBLEM

Structural supports were rigid and would not permit much movement of the stack. Yet something had to give, so cracking of the stack was an ever-present threat. To protect the stack from failure, it was fitted with a shield of Armco ALUMINIZED Steel with an airspace between shield and stack. This protected the stack from wind and rain, prevented uneven contraction and solved a serious problem for the oil refinery.

HEAT- AND CORROSION-RESISTANT

Its combination of heat- and corrosion-resistance make Armco ALUMINIZED Steel ideal for many applications like this. At temperatures up to 900 degrees F it is used for heat reflection; at higher temperatures it becomes an excellent radiator of heat.

For more information on this special aluminum-coated steel, phone the nearest Armco District Office or write us at the address below.

See our catalog in "Sweet's Product Design File" for information on the other Armco Special-Purpose Steels.

ARMCO STEEL CORPORATION

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*Reg. U.S. Pat. Off.

November 16, 1953

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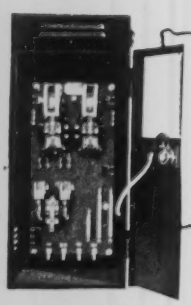
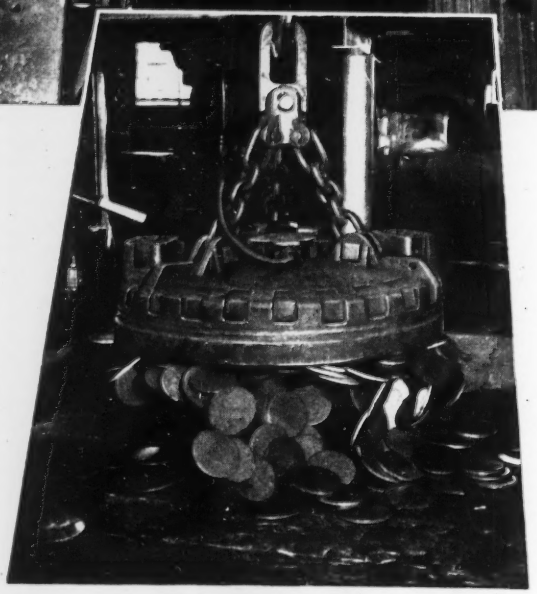
LIFT DROP

Small Master Switch—convenient, compact and only 2 positions "Lift-Drop" simplify operator's motions.



Adjustable Controller—only EC&M Bulletin 905 Controllers have a dial permitting operator to adjust for fast, clean releases when voltage varies — material handled changes.

Improved Design Magnet—ALL-WELDED to keep pole shoes tight—keep moisture out—increase the efficiency of the magnetic circuit and prolong life.



55-inch diam. EC&M Type SW ALL-WELDED Magnet speeds handling of large diameter discs stamped from steel-plate.

WRITE FOR BULLETIN 900 *ON IMPROVED EC&M ALL-WELDED MAGNETS*

THE ELECTRIC CONTROLLER & MFG. CO.

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Whose Responsibility?

In some quarters industrialists are concerned as to how politicians will interpret the results of recent elections. Specifically they are wondering whether the defeat of a number of Republican candidates in certain parts of the country will cause President Eisenhower and his advisers to shift his originally avowed "center-of-the-road" course somewhat to the left.

There are some indications that the administration is considering seriously certain departures from its original objectives. Certainly some administration spokesmen have grown lukewarm about further attempts to balance the budget. It seems likely that Congress will be asked to lift the debt limit. There are signs that new changes in the Taft-Hartley Act will be proposed some of which are definitely intended to placate union leaders. Concurrently there seems to be a movement on foot that will smooth the ruffled feelings of certain groups of farmers and cattlemen.

The degree to which these proposed policies will differ from the administration's original program cannot be determined in advance. However, it must be apparent to everybody that the Eisenhower administration is yielding to the age-old admonition to apply the oil to the part that is squeaking the loudest. Also it must be conceded that since the national election a year ago, the forces of the left have made much more noise than the forces of the right.

Every effort of the Eisenhower administration to reduce federal employment, reduce expenses, eliminate handouts, restore integrity of the dollar and remove the federal government from the field of private business has been met with loud wails of protest from federal officeholders, fair dealers, new dealers, left wingers, socialists, radical union spokesmen and every pressure group that has been enjoying federal favors.

While this din of protest from the left has been ringing throughout the nation, many of the people who voted for a change last November have been strangely silent. They have acted as if their responsibility ended on Nov. 4, 1952, when their votes elected General Eisenhower.

Their responsibility did not end then. They have a lot to do to make amends for running out on the administration they elected.

E. L. Shaner

EDITOR-IN-CHIEF

TO SERVE YOU BETTER: This issue of STEEL arrives at your desk in two sections. We suggest that you take sufficient time to examine Section II carefully because we know that much of its content will be of special value to you. It provides services that never before have been available.

Section II is a machine tool buyers' guide and a report on machine tools and tooling. The buyers' guide consists of a listing of more than

20,000 types and sizes of American-made machine tools classified under 12 headings. With each type or size of machine tool listed there is a manufacturer's code number. By referring to convenient key listings, the reader can easily find the name of the manufacturer or manufacturers of the specific type and size of the machine in which he is interested.

The report on machine tools and tooling is based upon replies from 2104 machine tool users who filled out a comprehensive questionnaire dealing with many problems of direct interest to all builders, distributors and users of machine tools. Results of this exhaustive survey afford a reliable indication of trends that may be expected in the next few years.

Do not make the mistake of passing off this Section II as "just another supplement." It represents a lot of original and constructive thinking, hard work and an extraordinary amount of fine co-operation on the part of hundreds of machine tool builders and users. Most readers can use it profitably.

BIRTHMARKING ALLOYS: In common with many other users of ferrous and nonferrous metals, the Department of the Air Force has encountered considerable trouble in identifying alloy metal products. Some months ago it made a strong plea for a uniform system of marking rolled steel and nonferrous products in order to cut down the waste caused by lack of proper identification. A brief summary of this crusade for "birthmarking" alloy products appeared on page 46 of the July 20 issue of STEEL.

Air Force procurement agents found that although some large users of alloys have adopted individual markings, there is no uniformity among them. A check of three steel warehouses showed that of six specifications of steel bars that were color-marked, only one bore the same color in all three warehouses. A check of six steel producers showed absolutely no uniformity or even remote similarity in their color identification of AISI designated steels.

* * *

AIR FORCE DRIVES ON: Apparently the Air Force made such a strong case for birthmarking that Department of Defense instructed Defense Supply Management Agency to prepare a uniform marking specification to identify alloys. At the time these instructions were issued it was hoped the marking system would have been developed by early 1954. If adopted, uniform marking would become mandatory and the marking specifications would automatically become a part of the procurement contracts of the Army, Navy and Air Force.

We do not know how much progress has been made in developing the proposed American system of marking, but we are informed that the Canadian Government Specifications Board has issued a standard code for the identification of steels.

CANADA ISSUES CODE: Without fanfare, the Canadian board has developed and issued Code 50-GP-1 for the identification of steels. It assigns standard colors to 24 AISI and SAE steels in four general classifications (p. 119) carbon steels, alloy steels, tool steels and stainless and heat-resisting steels. It also provides for two methods of identification ink or indentation stamping. Identification marks shall not be less than 3 feet apart.

It would appear that our Canadian friends are somewhat ahead of us in developing a system for birthmarking metal products. Obviously, the situation presents a golden opportunity for international co-operation. Why don't we get together on this problem of birthmarking which is so important to both nations?

* * *

NEW LAKE ORE RECORD: Last week the Lake Superior Iron Ore Association reported that iron ore shipments to lower lake ports during the 1953 season up to Nov. 9 totaled 92,720,346 tons, exceeding the highest full-season tonnage on record. The peak full-season shipments totaled 92,076,781 tons in the war year of 1942.

This means, of course, that from now until the end of navigation every trip of every carrier will be increasing the margin by which 1953 tonnage tops the previous record. Also it should be noted that whatever the total tonnage may turn out to be, it will fall far under the amount of ore that could have been transported if necessity had demanded it. Removal of vessels from service began some time ago, and today more than 50 already are in winter storage.

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SPEED UP

METAL-CUTTING JOBS

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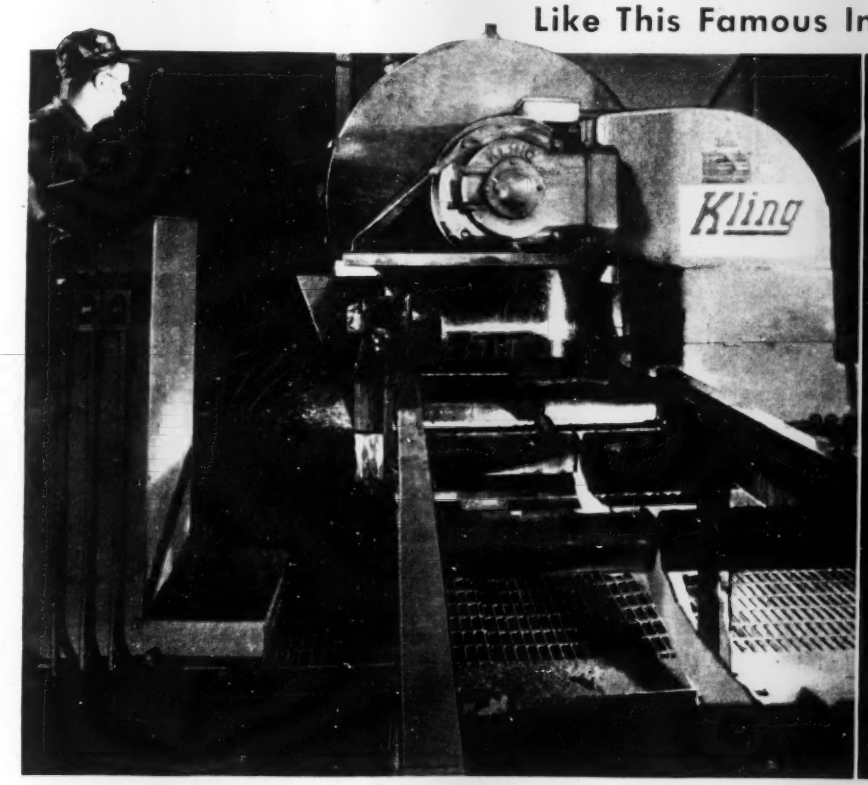

Report From
Allis-Chalmers Manufacturing Co. Milwaukee Plant

Machine
Kling Friction Saw

Jobs Performed
Cutting channels, angles, round, square and flat bar stock.

Average Cuts Per Day
1000 to 1300 per 8 hours

What Does It Replace?
Kling Friction Saw in use from January 1928 to July 1953.

Kling HIGH SPEED FRICTION SAWS

cut cutting-time **IN THE "BEST OF COMPANIES!"***

Can you cut 24″ 100 lb. I-Beams in 28 seconds...15″ 55 lb. Channels in 15 seconds...8″ x 8″ x ¾″ Angles in 11 seconds? These are only a few examples of what the Kling High-Speed Friction Saw is doing daily in many of the country's most important metal working plants. No wonder Kling Machines are attracting "top-level" attention!

Friction Sawing works differently—cuts metal by generating heat through friction, on to the part to be cut, at a rate faster than the part can absorb heat. Kling Friction Saws cut all types of steel, hard or soft, large or small, in any shape, without distortion, and without change of blade or set-up.

The average Kling Friction Saw blade will give a full day's production before requiring redressing, thus eliminating costly downtime and saving on tool costs.

* *The following are some of the companies using Kling Machines*

American Brake Shoe Co. Bethlehem Steel Co. Inc. Carrier Corporation
International Harvester Co. Jones and Laughlin Steel Corp.
Kaiser Steel Corp. Link-Belt Co. Madsen Iron Works, Inc.
Maryland Dry Dock Corp. Shell Oil Co.
Wabash Railroad Co. Westinghouse Electric Corp.

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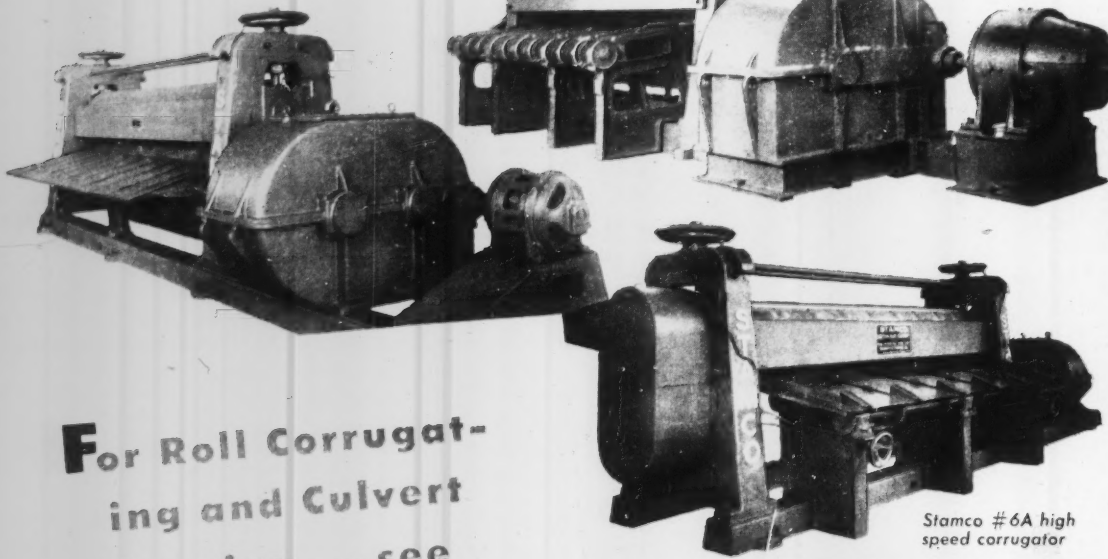
Since 1892 **Kling** ***...an investment in speed!***

Stamco #6 standard 12 ga. x 144"

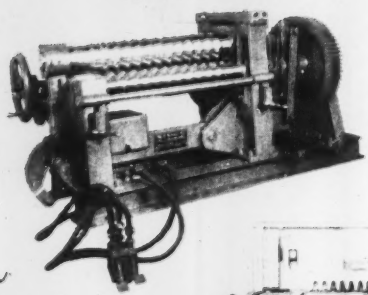
#8 corrugator 8 ga. x 168"



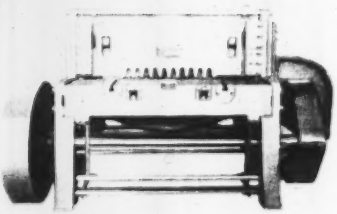
Stamco #6A high speed corrugator

For Roll Corrugating and Culvert forming . . . see

Stamco

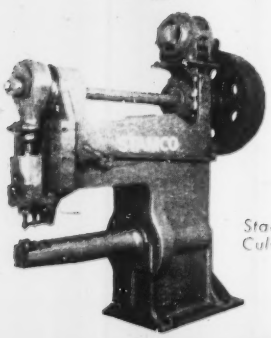


Stamco 8 ga. Culvert Curving roll



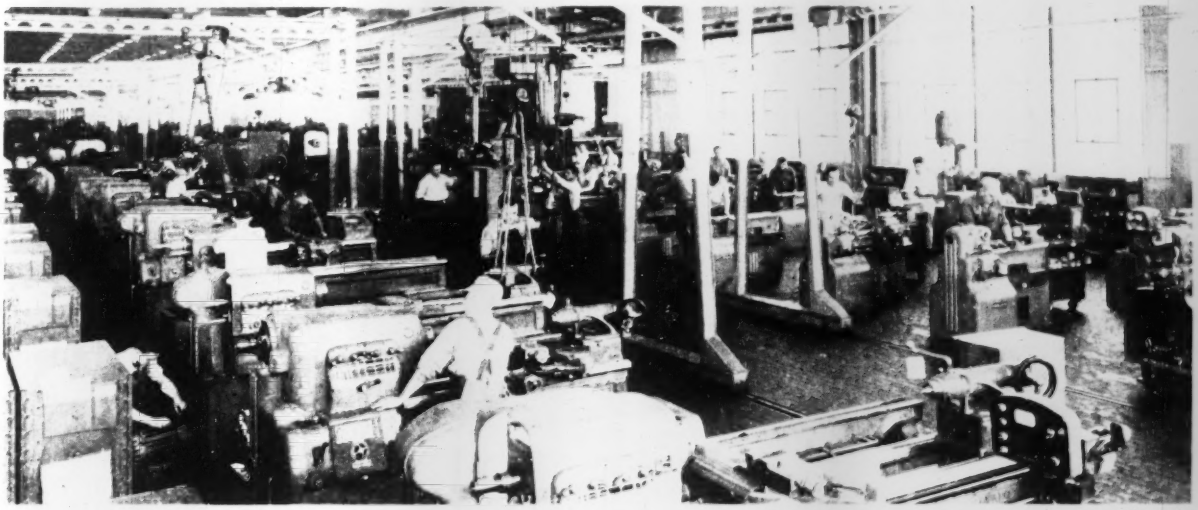
Stamco 8 ga. x 36" corrugated shear

Stamco high duty Culvert Punch and Riveter equipped with air operated friction clutch



Stamco standard Culvert Punch and Riveter

STAMCO, Inc., New Bremen, Ohio



Monarch

Broaching the Sales Problem

Machine Tool Builders Adjust for Competitive Patterns

"THE MACHINE TOOL industry is headed into an era of highly competitive selling, not only competition from within our borders, but competition from abroad."

With those words, Swan E. Bergstrom, past president of the National Machine Tool Builders' Association and vice president, Cincinnati Milling Machine Co., summed up the feelings of the association members at their fifty-second annual meeting at Boca Raton, Fla., last week.

Harmony—While there is little general pessimism about the future, virtually all machine tool builders agree that some tuning up must be done before they can go into high gear in this era of intense competition.

First, and some think most important, new design and engineering must continue to progress at a rate which will enable the builders to meet the requirements of industry in this country and to recapture some of the foreign market which has dwindled in recent years.

Second, the industry must utilize a strong, aggressive, hard-hitting sales organization to get the right machine tools on the right job throughout metalworking. The builders recognize a bigger challenge to selling than has existed for more than a dozen years.

Third, the industry feels it must continue to work with Washington to advise government officials on those matters of concern to the metalworking industry. Many government officials recognize the need for information and experience which industry has to offer, and close co-operation here will establish the proper climate for future business.

What It Means—This close co-operation with Washington embraces tax provisions, renegotiation legislation, import-export laws and such government plans as those for leasing machine tools for standby capacity (see the following story on page 70).

L. D. McDonald, executive vice president, Warner & Swasey Co., Cleveland, and chairman of the association's tax policy committee, says, "By far the most important tax change is that . . . with respect to depreciation provision. I say 'most important' deliberately because it affects not only the machine tool industry, but all those metalworking companies whose important fixed capital is being rapidly eroded by an improper, uneconomic tax regulation."

Signs of Change—Mr. McDonald sees a renewed interest on this matter on the part of many people in Washington. Desire for new provisions on the part of the machine tool users is shown in STEEL's machine tool report. (See Section II this issue, page 9.)

Herbert L. Tigges, executive vice president of Baker Bros. Inc., Toledo, and new president of NMTBA, cites the need for a greater degree of standardization and uniformity in government procurement policies.

Getting Easier—General concession is that the task of working with Washington is getting easier. Perrin G. March III, president, Cincinnati Shaper Co. and director, Metalworking Equipment Division, Business & Defense Services Administration, says it is the intent of the present administration to: First, restore the Department of

H. L. TIGGES
. . . new president of NMTBA

M. A. HOLLENGREEN
. . . new 1st v. p. of NMTBA

Commerce to its former high position and second, give business a permanent voice in government affairs.

Machine tool exports, now low, should begin to return to their more normal 20 per cent of the total output. One company thinks 1954 will see about 25 per cent of its output sent abroad. The future seems brighter here.

General machine tool production seems to be in no danger (see STEEL, Nov. 9, p. 73) as a 1953 volume of $1.2 billion will surpass the $1.1 billion of 1952. Next year shows no sign of any substantial drop.

Tool Builders Wary of Government Leasing

TOOL BUILDERS and used machinery dealers see a veiled threat in Office of Defense Mobilization Order VII-4.

That order provides for the leasing of government-owned production tools and equipment for non-defense purposes when there is no immediate defense need for such equipment. The order further provides that leasing will not be done except in extraordinary circumstances and where such usage would prove of value to the national defense. The action is reasonable from the government viewpoint.

Stickler — Menacing aspects of the order consist of its undefined terms, such as what constitutes "extraordinary circumstances" and the principle of government action which Order VII-4 establishes. Neither the Defense department, which controls the lion's share of government-owned tools, nor General Services Administration, the only other government agency involved on a practical level, has revealed how the plan is to be implemented.

Estimates of the number of government-owned tools range from 300,000 to 400,000. Part of these tools are either so old or so deteriorated they're worthless. For example, even during the worst of the Korean war production crisis about 34,000 machine tools listed as in the defense reserve actually could not be used.

Whittling Down—There also are thousands of single-purpose tools in the government reserve; tools intended for one munitions-making operation and not adaptable to civilian uses. Then, there are many tools still being used for defense production purposes. The remainder, say 75,000 tools, would not be a critical danger to civilian manufacturers or renters even if, at the worst, they were all dumped onto the civilian market over the whole country.

But they could be extremely dangerous to civilian manufacturers and renters if they become merely the vanguard and set the terms for bigger dumping operations in the future.

That's Why — So builders and dealers are becoming self-appointed watchdogs to see how Order VII-4 is implemented. They're still waiting.

Western Steel Spurts

Production for 1953 will race beyond best previous year by 12 per cent

STEEL PRODUCTION in the Far West will amount to about 6.9 million tons this year, 12 per cent greater than in the best previous year, 1951.

That means the district's steel output will account for a slightly larger share of the total U. S. production than ever before, Max D. Howell, executive vice president of the American Iron & Steel Institute, told a regional institute meeting in San Francisco. The 11 western states' share of national steel production will amount to roughly 6 or 7 per cent of the aggregate in 1953.

Small But Growing — "During the last 15 years, with the aid of technical progress, the national steel capacity has risen 46.6 per cent, and in this western district it has increased 250 per cent," said Mr. Howell.

Jack L. Ashby, vice president of Kaiser Steel Corp., noted that ingot capacity in the 11 western states was 4.8 million tons in 1946, but that had grown to 7,063,000 tons currently. "Steel demand in the West appears to be quite firm for the next several months, particularly for flat-rolled products," said Mr. Ashby. "We do note that our customers are not ordering as far in advance as they have in the past and that they definitely are more conscious of quality, service and price."

Keeping Pace — For the long term, Mr. Ashby predicted, "We're certain the future of the steel industry on the West Coast will be marked by important expansion programs to keep pace with the inevitable growth and development of the entire region."

Westinghouse Air Brake

Southern railroads pull a tariff switch that brings . . .

East-South Freight Rates in Balance

Southern rail tariffs on iron-steel list, traditionally higher than eastern, take 30 per cent cut to meet truck competition. North-to-South rate reduction due Nov. 21

RAILROAD FREIGHT RATES within the eastern and southern sections of the U. S. are in approximate balance for the first time in the history of the roads because of the reduction put into effect within the southern area on Nov. 5. And further efforts to meet the competition of truckers may reduce rates on shipments from North to South on Nov. 21.

The southern rate reduction, which covers the complete manufactured iron and steel list, averages about 20 per cent. In addition, the surcharge of 15 per cent has been dropped, making the overall reduction about 30 per cent. This follows by three years the rate reduction made in May, 1950, within the eastern area which averaged 25 per cent on a selected list of iron and steel products. There are reports that the eastern roads, pressed harder than ever by truck competition, are considering further reductions.

Looking Ahead—On Nov. 21, reduced rates probably will go into effect on iron and steel shipments from the North to the South, unless the Interstate Commerce Commission rules otherwise. That is not likely, in view of the position ICC took in the southern case. Truckers registered their protests there, but the commission decided not to interfere. The same procedure is expected to follow on the North-to-South reduction.

The new southern rates narrow the gap between rail and truck rates, in some cases giving railroads the advantage. Neither the southern rates nor North-South changes are expected to have much effect on the freight absorption pattern now shaping up, say steel producers.

Reverse—As a result of the proposed Nov. 21 reductions, it is expected that southern roads will petition for a like reduction in rates from the South to the North. The interterritorial reduction will amount to about 25 per cent.

Railroads operating between the Mississippi river and the Illinois-Indiana border, which are part of the Illinois Freight Association, are scheduled to put the new rates into effect Dec. 12 because of difference in filing date. An attempt may be made to push the date back to Nov. 21 in conformance with eastern roads, however.

Hassle on Piggy-back

Truckers chide ballyhoo in proposal to carry trailers aboard freight cars

MORE STUDY needed, less ballyhoo desired.

That's the official position of American Trucking Association concerning the much-publicized plans for transporting truck trailers on freight cars.

Against—Discussing the "piggy-back" movement at its convention in Los Angeles, ATA listed these four objections to the proposal:

1. Publicized highway relief from truck traffic is overrated. Relief would be only minor. 2. Hauling trucks by rail would result in truckers paying a disproportionate share of taxes. 3. Such a program would weaken the defense transportation program by placing more reliance on railroads. 4. A rail-truck combination will involve lengthy legal and regulatory tangles and have complex effects upon existing rate schedules.

But the issue has its credit side, too, and several railroads and companies making equipment involved are showing much interest. General Motors Corp.'s Electro-Motive Division recently announced its new freight car for carrying two trailers, and Pullman-Standard Car Mfg. Co. is working on a one-trailer car. Fork-lift truck makers have also entered the act with loading equipment.

Revenue Talk—Particularly interested are some railroads who are eying possible recovery of some of the less-than-carload business lost to trucks. New York, New Haven & Hartford has been providing "piggy-back" service in the East since 1937. Most recent big railroad to adopt the plan is the Chicago & North Western.

"Piggy-back" proponents claim the railroads can provide the trucking industry faster, more economical transportation, particularly at distances of 250 miles or more.

Matter of Economics — The big question is the economics involved. Adequate terminals and handling equipment would run into millions and then there's the problem of establishing rates fair to all involved.

Industrial Research: A Few Do Most

Three industries do half the industrial research in the country, according to a Labor department survey. Defense contracts set the pattern

HALF the industrial research and development work done in the U. S. is centered in the aircraft, electrical machinery and chemicals manufacturing industries, according to a Labor department survey.

These industries together employed more than 50,000 of the 96,000 research engineers covered in the 1952 survey of nearly 2000 firms spending close to $2 billion for research in 1951 about 85 per cent of the total national cost of industrial research and development at that time.

Highlights—The report on the survey, "Scientific Research and Development in American Industry," brought out these two characteristics of American industrial research: Defense contracts do much to stimulate such activity; research tends to concentrate in large companies.

The national government financed 85 per cent of 1951 research costs in the aircraft industry; 57 per cent in the electrical machinery and professional and scientific instruments industries; 31 per cent in fabricated metal products (meaning nearly 70 per cent was financed from private sources); and 24 per cent of machinery (other than electrical) research was government financed. The average of government backing for research was 47 per cent.

To the Big—About 40 per cent of the research engineers worked for the 41 largest companies in the survey, each of which employed more than 25,000 persons. Only 4 per cent of the research workers were employed by the 642 reporting companies with fewer than 100 employees.

Other topics discussed in the report on the survey include rate of turnover of research staffs; research engineers and scientists as a percentage of total company employment; and various cost comparisons of research work (see below). Copies of the report, Bulletin No. 1148 of the Bureau of Labor Statistics, may be purchased from the superintendent of documents, Washington.

The Cost of Doing Research

Manufacturers trying to estimate the cost of a particular research job or to decide on the size of staff required for a research program of a given dollar size can learn much from the Labor department's report, "Scientific Research and Development in American Industry" (see above).

The report reveals average cost per research engineer or scientist was $21,900 in 1951, all 2000 companies considered. Average cost per research worker, professional or nonprofessional, was $8800. Since much industrial research is done by a few large companies, however, their costs greatly influenced the averages presented in the report.

Half the companies in the survey had a cost of $13,500 or less per research engineer or scientist. The fourth with the lowest costs each had a ratio of $8900 or less compared with ratios of $20,500 or more for the fourth of the companies having the highest research costs.

V-Loan Program Totals Up

Since the beginning of the V-Loan program in September, 1950, procurement agencies have authorized 1269 loans totaling $2,310,182,000 through Sept. 30, 1953.

Of the $860,874,000 in loans outstanding as of the latter date, $709,488,000, or 82.5 per cent, was guaranteed. An additonal $438,091,000 was available to borrowers under guarantee agreements in force.

Nineteen per cent of the number and about one per cent of the amount of loans authorized consisted of loans under $100,000, while 57 per cent of the number and 6 per cent of the amount were under $500,000. Twelve per cent of the number and 1 per cent of the amount of loans authorized were to borrowers having assets of under $100,000; about 44 per cent of the number and 9 per cent of the amount were to borrowers having assets of under $500,000; 60 per cent of the number and 14 per cent of the amount were to borrowers having assets of under $1 million.

NLRB Reverses Decision

National Labor Relations Board reversed a policy of five-years' standing in ruling that part-time plant guards cannot join unions composed of other types of employees.

The four-member board, chairmanned by Guy Farmer, voted unanimously to deny plant guards

the right to join a union with other workers even if their guard duties take up only a small part of their work day. They can still join unions composed only of other guards. Formerly, the NLRB had ruled plant guards could be members of unions with other employees if they spent less than half their time on guard duty.

More Silicon Sheet Coming

U. S. Steel Corp. announces plans to augment finishing facilities at its Vandergrift, Pa., plant of the Irvin Works. Production of grain oriented silicon sheets and coils and completely modern finishing facilities to produce all types of silicon sheets will be added.

When installation of new equipment is complete the proportion of cold-rolled sheets as compared to hot-rolled product will be increased to follow the trend in product demand. (Cold-rolled sheet production is lower than demand here.) It will also make possible output of silicon sheet with improved electrical properties used in most modern types of electrical equipment.

Work will begin immediately and should be completed by 1955.

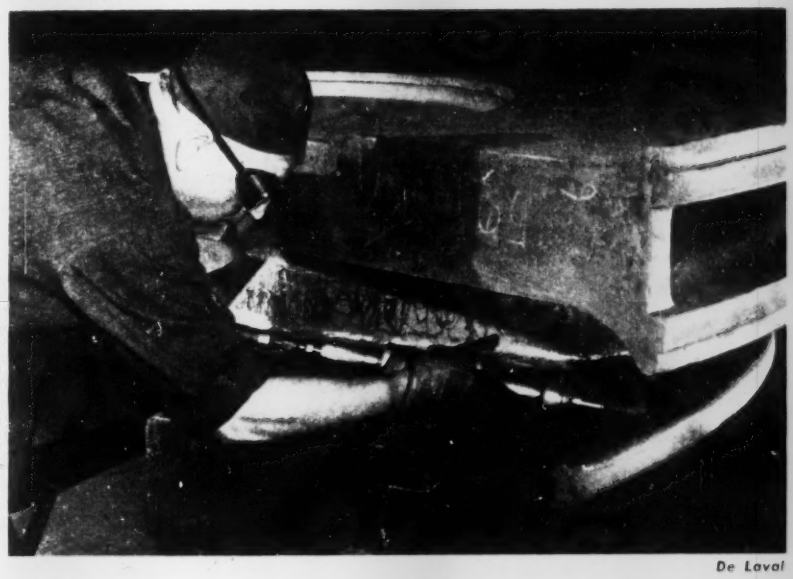
Steel Founders Face Future

Another sure sign that the metalworking industry knows it faces a more realistic selling economy was reflected at the recent technical and operating conference of Steel Founders' Society of America, held in Cleveland.

Nearly 600 members, by far the largest group that has ever assembled, heard and discussed some two dozen papers in the three days. Conspicuous was the general theme: Improving product quality for competitive selling.

"The industry has to look ahead to be able to meet rigidized government and industry specifications," reports F. Kermit Donaldson, executive vice president of SFSA. The big upswing in technological interest, evidenced at the various sessions, is indicative of the stronger demands being placed on the industry, he added.

Foundries all over the nation sent technical men. More than 20 firms on the Pacific coast and a host of Canadian companies were represented.



De Laval

Old and new applications pace a young industry as . . .

Air Tool Makers Drive for Market Expansion

"TOUGHER COMPETITION will be money in the bag for us in 1954. Manufacturers will be searching for methods to reduce costs per unit in their markets race and pneumatics has the solution to their problems!"

That's the type of buoyant optimism prevailing today in the young pneumatic tool industry, which, according to its leaders, is just beginning to realize its real potential.

Impetus — Certain air-powered tools have been around a long time, but World War II's demand for assembly-line speedups gave pneumatics new impetus. Companies like Bellows Co. in Akron grew from small shops to multimillion-dollar concerns developing new tools and new applications for existing ones, and the industry was on its way. Companies contacted by STEEL report that sales for 1953 are leading 1952 by as much as 30 per cent for some manufacturers. None said they expect a drop.

Pneumatic tool uses are nearly limitless: Grinders, drilling machines, buffers and riveters are some of the most popular. Newer applications finding their way more and more into industry include multiple nut runners, starting motors, impact tools and a variety of positioning devices.

One to Hundreds—Competition in the pneumatics field, like all others, is increasing. Approximately 20 companies make pneumatics, ranging from the manufacturer who specializes in one item like Madison-Kipp Corp., Madison, Wis., which makes a toolroom grinder, to Ingersoll-Rand Co., New York, making hundreds of tools.

Distribution of products also varies from strict direct mail programs, like Montgomery Engineering Co., Detroit, uses for its riveters, to salesman and factory representatives calling on individual companies, a method used by the Moll Tool Co., Chicago. Delivery for most pneumatics today is immediate, although some tools may take two weeks to two months.

Some Slack—Defense cutbacks were felt by some pneumatics-makers after mid-1953, but for most companies more orders from other industries are taking up most of the slack. Big users of pneumatic tools are the automobile, aircraft, household appliances, electronics and construction industries. Growing markets are being found in the plastics industry too.

If you're in the metals industry,

pneumatics may offer market possibilities. Castings and forgings in steel are a big item as well as an assortment of nonferrous metal applications for aluminum, manganese, bronze, brass and copper in pneumatics manufacture.

Potential to the South—Competition from imports has not created any difficulties for the U. S. pneumatics men. Most report that their exports are only slight, but more emphasis can be expected if the markets picture in this country changes radically. A better currency exchange with South America would probably place more U. S. pneumatics in those countries.

But the industry isn't worrying about markets or business for at least the next year. They're betting they've got a pneumatic application which will cut your product's unit cost.

Minerals-Buying Progress

General Services Administration announces quantities bought to date of domestic tungsten, manganese, chrome, mica, beryl, asbestos and columbium-tantalum under government programs to stimulate the search for and production of strategic minerals in the U. S.

Edmund F. Mansure, GSA administrator, says these programs are separate from the exploration program of the Defense Exploration Administration.

Tungsten: Purchases authorized 3 million short ton units of 20 pounds per unit; delivered to date 391,465 short ton units. **Manganese:** Purchases authorized for all receiving points 37 million long ton units of 22.4 pounds per unit; delivered to date 2,724,406 units. **Chrome:** Purchases authorized 200,000 long tons of ores and concentrates; delivered to date 37,400 long tons. **Mica:** Purchases authorized 25,000 tons of hand-cobbed mica or the equivalent; delivered to date 2192 tons of all types. **Beryl:** Purchases authorized 1500 short tons; delivered to date 128 short tons. **Asbestos:** Purchases authorized 1500 short tons of crude No. 1 and or No. 2; delivered to date about 95 tons. **Columbium-Tantalum:** Purchases authorized no limit; delivered to date 1,923,027 pounds from foreign and domestic sources.

Business Good—Go Get It

Refrigeration and air conditioning equipment makers ignore talk of a downturn in business next year. They believe business will be good and intend to go out after it

"BUSINESS LOOKS GOOD next year for those who are willing to go out and get it," said Carl E. Buchholzer, president of Airtemp Division, Chrysler Corp., keynoting aisle talk at the 8th annual Refrigeration & Air Conditioning Exposition in Cleveland.

Optimism pervaded the show. Many manufacturers predict as much as 50 per cent gains in sales next year; nearly all expect to at least equal 1953 volume.

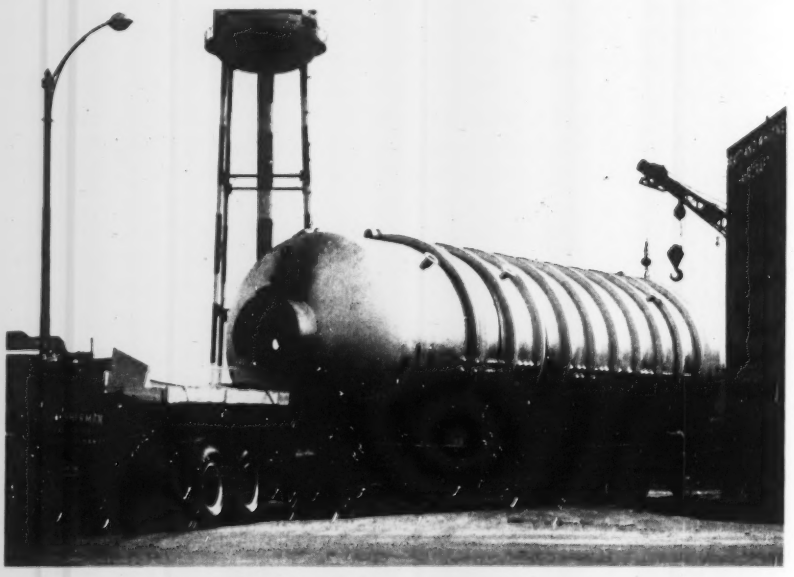
Better Than Best—At that rate, manufacturers' sales of air conditioning and refrigeration equipment, including room air conditioners but excluding household refrigerators and farm and home freezers, should top this year's record of $1 billion.

Exhibitors made it clear that they're not waiting for sales to come to them, however. New products and more complete lines of former products distinguished the exhibits. Most noticeable were new entrants into the field of room air conditioning, the sky rocketing segment of the industry today.

Fabulous Growth—There will be nearly 85 different lines of room air conditioners on the market in 1954 compared with 15 such lines in 1948. Industry output is expected to bound from 800,000 units in 1953 (nearly treble 1952 output) to 1,250,000 units in 1954.

Not just the glamour end of the business will be good next year. "Business in commercial refrigeration and air conditioning will be as good or better than this year too," said L. P. Hanson, vice president in charge of sales, United States Air Conditioning Corp. "The trend in compressor sales is up," commented F. J. Gleason, vice president-treasurer, Copeland Refrigeration Corp. "Our company will have about a 60 per cent gain in sales this year, and we hope to do as well again next. The industry percentage gain may not be that high, but the general trend is upward."

Second Way — Together with harder selling next year, manufac-



Upper Air Down to Earth

Arriving at Pratt & Whitney Aircraft's Andrew Willgoos Turbine Laboratory, East Hartford, Conn., is this 50-ton, 46 by 12 foot metal altitude chamber for testing jet engines. The chamber was fabricated by Process Engineering Co., Somerville, Mass., and annealed at Bethlehem Steel Co.'s shipyard at Quincy, Mass.

More Weight on Light Metals

Heavy emphasis on light metals is illustrated by this display of aluminum and magnesium castings, 64 pounds of them, which go into the 1954 Chrysler sedan. They represent a saving over heavier metal castings of approximately 183 pounds

turers will be paying more attention to production costs. One manufacturer told STEEL, "We all have to pay about the same price for labor and for materials. The difference next year will come in how well we've tooled up for efficient production and how much we get out of the labor we've got."

Four industry groups held meetings during the course of the show: Refrigeration Service Engineers Society, Refrigeration Equipment Wholesalers Association, Refrigeration & Air Conditioning Contractors Association and the National Commercial Refrigerator Sales Association. Selling was the predominant theme of these meetings also. G. S. Jones Jr., managing director, Air Conditioning & Refrigeration Institute, told the NCRSA meeting: "Our country's prosperity, our standard of living, was built not on supplying needs, but on creating wants. More than anything else, our ability to create wants will determine the extent to which we expand the field of refrigeration."

Stimulant—A record 234 companies participated in the Refrigeration & Air Conditioning Exposition, displaying some 5000 models and components. Attendance smashed records with nearly 14,000 persons appearing during the four-day session (Nov. 9-Nov. 12).

Help for Labor Surplus Areas

Office of Defense Mobilization revised its Defense Manpower Policy No. 4 to give special assistance to firms located in surplus labor areas in obtaining government contracts.

The revised order, which applies to 42 cities in areas where unemployment amounts to 6 per cent or more of the labor force, authorizes federal procurement agencies to let part of the total purchase on bids in the regular way, but to set aside the remainder for negotiation with firms in surplus labor areas. However, such firms must meet prices established by the bidding process.

Labor surplus area companies are given full opportunity to submit bids on all procurement contracts for which they qualify. In case of tie bids, the contract will go to the labor surplus firms.

Procurement officers are also instructed to encourage prime contractors to award subcontracts to firms in these areas. Small Business Administration and the Commerce department can supply procurement procedure information.

Good-by Detroit

Sale of Willow Run plant to General Motors sets departure of Kaiser from Detroit

SALE of its Willow Run plant to General Motors Corp. for $26 million will mean a complete shift of Kaiser Motor Corp. out of Detroit and into Toledo within a year.

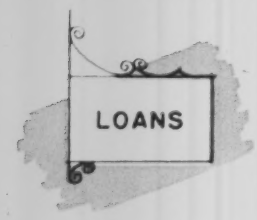
Manufacture of Henry J and Kaiser cars will be switched to the Toledo plant of Willys Motors Inc., Kaiser's new subsidiary, in that time. Meanwhile, space now occupied by Kaiser at Willow Run will be leased back to Kaiser for not more than 12 months, says H. H. Curtice, GM president. Main offices of Kaiser will be moved from Detroit to Toledo within the next year, too, adds E. F. Kaiser, KM president.

Big Pay Off—Mr. Kaiser says his firm will add $613,000 to the sale price of Willow Run and pay off $26,613,000 of its debt to the Reconstruction Finance Corp. That will leave the Kaiser debt to the government $18,640,000, now slated to be completely redeemed by 1959.

General Motors submitted a bid for the Willow Run facilities at the request of Mr. Kaiser, while still planning to rebuild its Livonia transmission plant, destroyed by fire, Aug. 12. The GM bid for Willow Run was accepted at a figure below the cost of rebuilding Livonia. So, the rebuilding of Livonia has been shelved.

Strike Two—That second recent fire to strike the General Motors transmission division, this time at Willow Run where GM leased space after the Livonia fire, was a comparatively minor one. An oil quench tank tripped the sprinkler system nozzle above it. The water hitting molten cyanide at 1500 degrees F caused a series of explosions which filled the plant with fumes and injured two employees slightly. Production was delayed about two hours and then resumed with parts being sent to Detroit heat treaters.

An interfamily race can be expected at GM for the other half of the Willow Run plant as Kaiser prepares to leave.



Business Health Looks Good, But Republicans Are Readying Vitamin Pills, Just in Case

A SPEEDUP of direct business loans by the government has been ordered by Wendell B. Barnes, acting administrator of Small Business Administration. The new policy comes right from the White House which considered inadequate the old plan which was to aid small firms in getting funds from private sources. William D. Mitchell, first SBA boss, left abruptly as a result of that old policy which he claimed was necessary because the agency had only $50 million to loan. The Republicans are carefully nourishing the little fellow and want more action from an agency that could be of great political importance.

Hint of the Future . . .

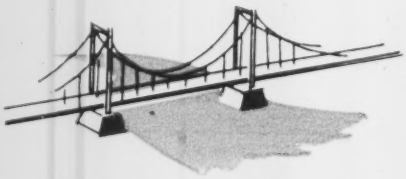
The Mitchell resignation gives a major clue to administration views on what to prescribe as an antidote for a possible recession. The chief ingredient of the medicine will be fiscal: more loans to distressed firms, lower interest rates, easier money. The next step would be to lower personal and corporate income taxes slightly. Also as part of the antidote's formula would be an extensive program of encouraging industrial expansion in labor surplus areas through rapid tax amortization and the judicious awarding of defense contracts.

Caution on Public Works . . .

Significantly, an expanded public works program would not be tried unless the other ingredients in the brew had been found wanting. That's because of experiences during the 1930s when it was found that the benefits of federal-financed construction took a long, long time to trickle through the economy. Of course, public works plans will be dusted off in a hurry if unemployment becomes widespread.

Highways First . . .

First on the list for a public works program would be highway developments. In fiscal 1952, the federal government spent $100 million on roads, while state and local



governments laid out $4.7 billion. That U. S. share would be jumped many times. Probably, the second major part of a public works plan would be reclamation dams, irrigation, flood control.

Mood Is Mellow . . .

But the mood in the capital on industrial outlook matters is decidedly bright now. The four members of the administration's family who speak most frequently on that subject: Treasury Secretary George M. Humphrey, Commerce Secretary Sinclair Weeks, Commerce Under Secretary Walter Williams and Defense Under Secretary Roger Kyes have all pronounced the patient generally hale and hearty, although ready for a diet to lose a little dangerous fat. Those four men, incidentally, are proving themselves among the strongest and most effective individuals in the Eisenhower official family.

Defense Debate . . .

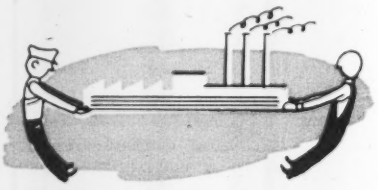
Of great import to the nation's economic health is the outcome of a debate now going on behind the scenes in the Department of Defense and the Office of Defense Mobilization. The issue: How to approach industrial mobilization. Industry men and some government officials believe that the approach should be on a percentage basis—so much for defense, so much for each segment of civilian manufacture; the percentage to be of the gross national product and based on past experiences in World War II and the Korean war. The other viewpoint, supported mainly by military men, is to allow *carte blanche* for defense and to give to civilian manufacture what is left.

The Probable Victor . . .

Proponents of the percentage approach will probably win the argument. But to make their plan workable, they must have a clear idea of military requirements. Many Defense department officials say that's difficult, if not impossible, to give in today's jetomic age. To use World War II and Korean war experiences as a basis for a decision about military needs, they argue, would be like sending up the Wright brothers' original airplane against a Russian jet.

Decisions Delayed . . .

The military eventually will have to say what it wants, but until it does a number of business-influ-



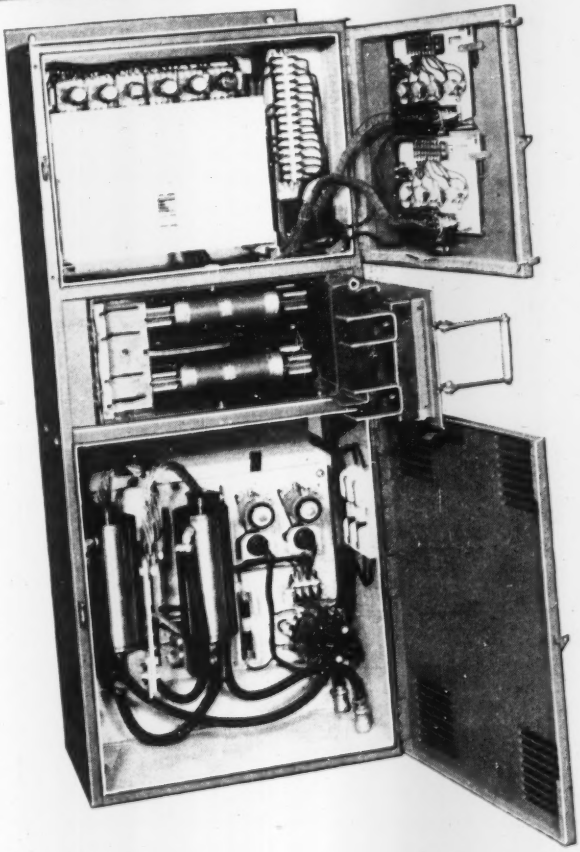
encing decisions can't be made—what to allow for defense spending in fiscal 1955, how much to raise or cut taxes, where to expand production facilities or where to close out expansions, to name just a few.

Prize Patient . . .

Government students of the nation's economic health are particularly anxious about expansion. They wish more of it for small business. With an eye on the political horizons of 1954 and 1956, Republicans want to be able to say: "The little fellow, he's my prize patient."

faster!

WELDING PRODUCTION ON REPEAT OPERATIONS



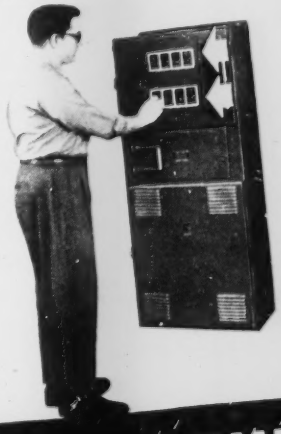
Square D's High-Speed Electronic Welder Control

faster! More spot welds per minute for repeat gun or machine welding operations . . . obtained by providing an additional **SQUEEZE DELAY** timing and a negative **HOLD** time sequence.

more consistent welds! Synchronized firing of ignitron tubes (welder transformer) and full cycle conduction provides uniform heat for each weld. Vastly improves quality of work.

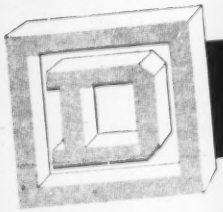
less maintenance! Control unit uses heavy duty relays and components specifically designed for high speed welding service. Minimizes down time.

plus safety! Square D Fail-Safe tube circuits do not require conduction of an electronic tube to stop the weld . . . less possibility of danger to the operator and damage to the machinery.



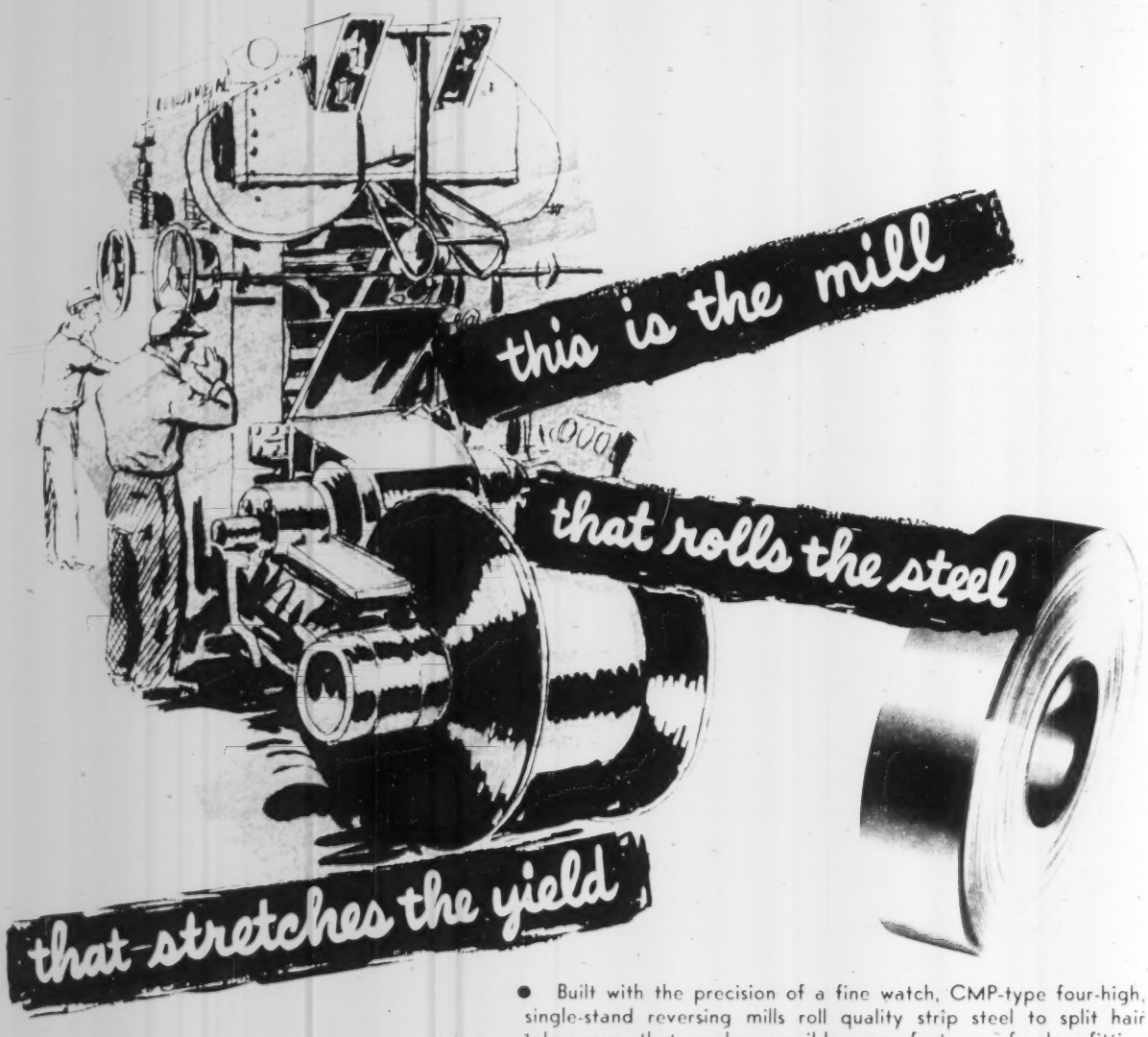
dual SEQUENCE ADJUSTMENTS . . . provide complete control of two welding guns operated from one welder transformer and controller.

Write for High Speed Welder Control Bulletin #8992. Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin.



SQUARE D COMPANY

1903 · **50 YEARS OF DESIGN LEADERSHIP** · 1953



● Built with the precision of a fine watch, CMP-type four-high, single-stand reversing mills roll quality strip steel to split hair tolerances that make possible manufacture of close-fitting functional parts . . . increase production per machine hour by reducing down time due to wear on tools and dies . . . increases production per ton fabricated because of greater yield.

When all factors of end product cost are considered, competitive tests often show that CMP can supply the strip steel most economical for production use. The steel buyer who considers only first steel cost per ton often overlooks the possibilities of lowering fabricating costs and thus reducing final end product cost by the use of CMP specialty strip steel products. We will welcome opportunities to run competitive tests in your plant. We think you will agree it will be time well spent.

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Foreign Trade Policy Coming to a Head

American metalworking manufacturers are a focal point in foreign trade decisions due early next year. Raw materials producers and retailers also involved

LIKE IT OR NOT, foreign imports promise bigger problems for American manufacturers at all levels of business next year.

Tom Pickett, executive vice president, National Coal Association, says: "We fought for a quota limitation on residual oil imports during the last session of Congress but didn't quite make the grade. Now we are planning to come back again in January and to continue our crusade until we succeed in getting some action." On the other hand, foreign countries, such as Venezuela, threaten swift retaliation in the form of reduced imports from the U. S. should oil imports into the U. S. be restricted through new legislation.

In Retail Sales—Morford S. May, secretary of the Arkwright Export & Import Co. Inc., is enthusiastic about prospects for a steady growth in imports of merchandise made specially for the American market. Arkwright Export & Import is a subsidiary of Arkwright Inc., a domestic buying organization, which has 127 corporate store members doing an annual business of about $800 million in 157 major trading areas of this country. American consumers react most favorably to foreign goods when good taste in product and fineness of finished detail are primary considerations, he said. Left unsaid was the fact that goods bought overseas for department stores cannot be bought from American manufacturers.

Reports from foreign countries before the Commission on Foreign Economic Policy, chairmanned by Clarence B. Randall, stress the need for freer imports of manufactured goods into the U. S. Though not part of these reports, a statement by J. D. Ferguson, president of the Canadian Manufacturers' Association, sums up their inferences: "The U. S. virtually shuts out manufactured goods of other countries. Total U. S. purchases from Canada do show an increase, but don't talk about that to the manufacturer of Canadian finished goods. In 1951 U. S. imports of finished goods amounted to only 26.9 per cent of

CLARENCE B. RANDALL
. . . an end to uncertainty

total imports. In comparison Canada's imports in 1951 were 75.1 per cent manufactured goods."

Undecided — What's the most troublesome aspect of American trade policy according to foreign countries doing business here? The uncertainty of its dispensation, say the foreigners. Just when imported products begin to make their way in the American market, the tariff commission is petitioned to plug up such imports. Even if escape procedures are not used, it has a depressing affect on the foreign manufacturer for he never knows when new tariffs will be invoked.

If U. S. import policy is revised to mollify this criticism, it will be harder to change duties once they're set up, and manufactured goods will be the class of products most affected. If U. S. policy is not changed, foreign countries threaten reprisals in buying American goods.

Either way, next year will be the year of bigger foreign trade problems.

U.K. Ups Steel Target

In case you missed it, the British steel industry has set a target of 22 million tons of basic steel output by 1957. In addition, it's expected there will be about ½ million tons of re-usable steel and about ½ million tons of steel imports a year available to U. K. manufacturers at that time.

The British Iron & Steel Institute says the expansion is based on the assumption that economic activity will continue on a high level throughout the western world, permitting the maintenance of full employment in Britain, a high rate of capital investment there and a considerable further expansion of metal goods exports sufficient to ensure a substantial surplus in the U. K. balance of payments. It's an assumption, says BISI, that "might be considered overoptimistic."

Canadian Plants Hum

Canadian assembly plants of General Motors of Canada have already exceeded the 1952 12-month production total, says William A. Wecker, president.

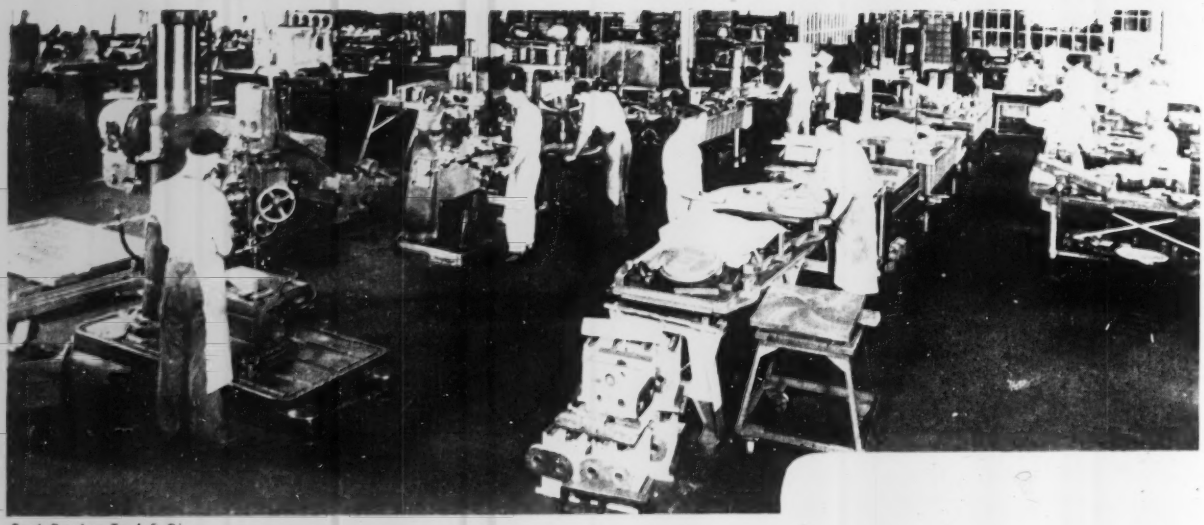
Unit production of cars and trucks by General Motors of Canada in the first ten months of 1953 was 201,964 compared with 200,310 in the 12 months of 1952.

Canada an Exception

U. S. first half, 1953, imports of $5.6 billion and exports of $6.1 billion followed the same geographic pattern as in the last half of 1952 with one exception. Canada took more and sent less proportionately than last year.

FOA Goes to the Philippines

Feasibility of erecting an electrometallurgical laboratory in the Philippines for refining and treating ores is being considered by the Philippine government. Adviser on this project is Stephen M. Shelton, Bureau of Mines regional director at Albany, Oreg., who recently left for Manila under arrangement of Foreign Operations Administration.



East Dayton Tool & Die

- Savings in materials and supplies
- Improved quality control
- Increased volume of production
- Reduction in unit labor and overhead costs
- Product improvements raising sales value

When Incentives Cover Engineers

Productivity Goes Up

Engineers and designers share in the same bonus plan as the factory workers at East Dayton Tool & Die Co.

ENGINEERS and designers are participating in the same Rucker Share of Production plan as the hourly-rated factory workers at the East Dayton Tool & Die Co., Dayton, O.

One of the first in the precision tool, die and special machinery industry to adopt the Rucker plan, East Dayton feels that the inclusion of its engineers and designers is a natural. "Because of the nature of our operations, our engineers and designers participate more directly in actual production than most industries," Robert C. Renner, president, points out.

Team Work — The benefits to both the factory production men and the engineers and designers under the plan are obvious. Many of East Dayton's orders include not only the production of a tool, die or special machine but its design also. With greater productivity the goal, if a man on a machine spots a "bug" in a special design it is to his advantage to bring the matter up immediately with the designer, rather than to go ahead "come hell or snow" just because the "man upstairs" said to do it that way. Conversely, the designer is constantly striving to design equipment which will enable the hourly man to increase his productivity.

East Dayton's plan operates similarly to the Rucker plan at the Reznor Mfg. Co. (see STEEL, June 15, p. 50). A "production value" was established based on the company's past operations, and the employees strive to better their productivity through conserving materials and supplies and better workmanship (see chart above). "Production value" is equal to the sales value of the products produced minus the costs of all materials and supplies.

Constant Ratio—Major factor of the plan is that once the "production value" is established for a given company, the ratio of distribution of "value of added manufacture" between management and labor remains practically constant regardless of business activity levels.

Traditionally, productivity incentive plans are based on quality of production. Along with this are needed separate devices for inspection and quality control, controls of raw materials, preventive maintenance of tools and equipment and complex records to keep track of what is going on throughout the shop. East Dayton's employees can earn a bonus only on true value added in manufacture — a good, high-quality, saleable product made at lowest total cost.

Fool Proof—And when the added value is figured at the end of the bonus period (3 months for East Dayton) all employees under the plan share alike in the bonus. If

the bonus amounts to 10 per cent each employee gets an added 10 per cent of his pay for the period. No one man can "pace" an operation to get a larger bonus for himself at the expense of another worker. All employees have a common bonus goal to work for.

Another feature of the plan, which was installed under the guidance of Strong, Narovec & Co., Cleveland management consultants, is the productivity committee. With five members of the employee group and five members of management, the committee meets regularly to consider methods of increasing productivity. It also serves as a channel of communication between workers and management.

Everybody Gains—Adoption of the plan at East Dayton was the result on the part of both employees and management for a simple and effective method of rewarding "smarter workmanship" for both hourly production men and designers and engineers. They regard it as a practical approach to management-labor teamwork to the end of making more money *with* each other, rather than *out* of each other.

Westinghouse Sets Record

Westinghouse Electric Corp.'s $1.1 billion sales in the first nine months of 1953 set a record high for any like period in the company's history, Gwilym A. Price, president, reports. Net income for the period amounted to $53 million, equal to $3.26 per common share.

Third quarter, 1953, sales and earnings also set records for the company. All four major product groups of Westinghouse showed significant sales increases with consumers' items rising most sharply.

Furnace Orders Slide Off

Total net orders for industrial furnaces dropped 11 per cent through September, 1953, compared with the same period in 1952, says the Industrial Furnace Manufacturers Association Inc. Dollar value of orders for 1953 stands at $49,975,613; for 1952 it was $56,240,018. September orders were slightly below the monthly average for 1953 at $4,442,479 net, after adjusting for $57,542 in order cancellations.

Silver Goes Stainless

STERLING may still be the aristocrat of the tableware and flatware industry, but look out for that stainless; it's a comer.

In fact, in many ways, stainless steel has arrived as a material to grace the banquet table. About 7500 tons of the metal will be fabricated into knives, forks and spoons by 17 manufacturers this year. The uncertainty of its future lies in the possibility that its present popularity is based on the scarcity of nickel. It was not until the latter metal became so scarce following the outbreak of the Korean war that flatware began appearing in appreciable quantity in stainless. Now that there are no controls on nickel, some manufacturers may decrease or even drop the stainless lines.

Good Foothold—But most manufacturers of flatware indicate that on the whole, stainless will continue to be used to satisfy the market that cannot afford sterling or doesn't like plated dinnerware. It probably will not continue its rapid rate of growth in the field, however. Some makers estimate it has grown in use by 600 per cent in the past three years, with some sterling manufacturers placing the estimate more conservatively at 400 per cent.

All but one or two sterling shops have added stainless steel designs because of competition, and lack of satisfactory base metal, nickel, forced silver plate producers to do likewise. Sterling still accounts for 15 per cent of flatware production and 40 per cent of the dollar value; nickel-silver plate has 50 per cent of volume and 50 per cent of value and stainless produces the remaining 35 per cent and is worth 10 per cent of the value. It is obvious that one of the strongest selling points for the latter is its low cost.

Which Has the Silver?—Other strong points for stainless are design flexibility, brought about through advances in fabricating processes, and ease of care. One manufacturer presents duplicate designs in sterling and stainless in an attractive package and challenges the buyer to tell the difference between them.

The return of nickel to the flatware scene may help the stainless position as much as it would tend to hurt it. Most in use at present is straight chrome series 430. With more nickel available, producers may broaden their range and prices, going to the nickel-bearing grades to compete with heavier plated silver or sterling, yet continuing the chrome grade for the lower-priced market.

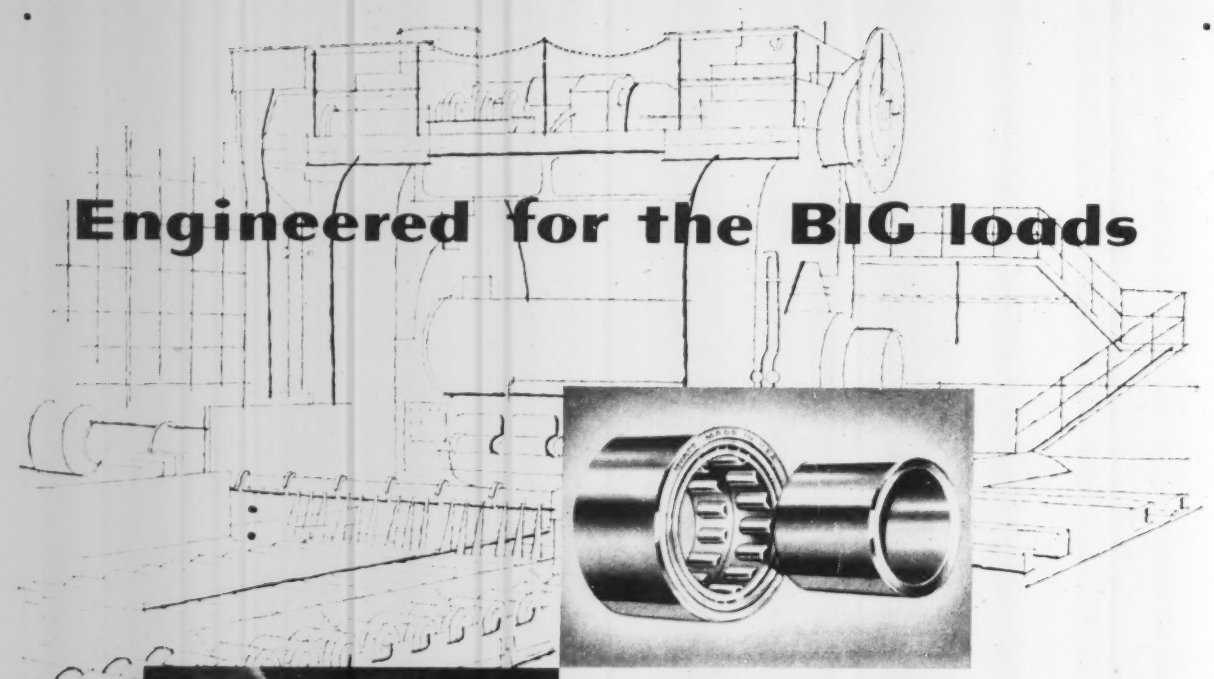
Domesticated—There is wisdom to such an approach, because much of the growth in stainless flatware has been the home market. Some studies indicate numerous families are buying stainless as a "second set" for everyday use.

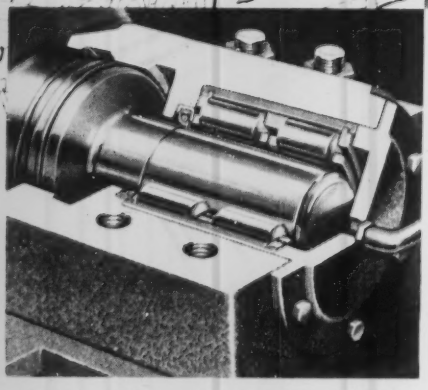
In any case, manufacturers are looking for a continuing market for the nickelless product for some time to come. They do not expect the supply of nickel to be great enough soon to return to pre-Korea plating practices. Even if those practices do return, the effects on stainless may be only temporary. Producers point out that even when nickel-silver was in better supply, stainless was making inroads in the silver plate field.

This year stainless tableware manufacturers expect to double the volume of 1952. To do this, they will push sales efforts through department stores, hardware shops and chain jewelry stores. The more high-toned jewelry establishments still are reluctant to merchandise it in competition with their higher-priced ware, however.

Still a Question — But as one Connecticut producer of flatware summed it up: "Stainless has a bright future in the flatware business, but that portion of the market it will best satisfy, or the extent to which it will encroach upon silver plate or sterling silver, is a long way from determination."

Engineered for the BIG loads





Cutaway view of Hyatt application to steel mill table rollers.

In the largest rolling tables . . . in cars, cranes, motors . . . in every type of steel mill equipment designed to handle tremendous loads—that's where you'll find Hyatt Roller Bearings! For Hyatts are engineered to carry the big loads of industry . . . reducing costs by reducing friction, and making possible increased production through greater operating efficiency. Hyatt offers the most complete line of radial roller bearings available anywhere, giving designers greater flexibility in achieving maximum load-carrying capacity within given boundary dimensions. More practical design, longer bearing life and simplified assembly procedures are among many benefits which result. For new equipment or for changeovers, specify Hyatt bearings. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

THESE ARE THE QUESTIONS AUTOMAKERS ASK—

- **How can seasonal and cyclical variations in auto demand be leveled out?**
- **How can sustained output of cars be stored without extreme cost penalties?**
- **What incentive would be given striking workers to return to work under a guaranteed wage?**
- **What would happen to unsatisfied demand during peak periods?**
- **How would a proper level of production be determined for each car?**

AN OPEN LETTER
to Walter Reuther, president, CIO—

Dear Mr. Reuther—

You have stated that you expect to obtain an annual wage guarantee for UAW-CIO members in 1955. In view of the extensive economic implications of a guaranteed wage program for an entire major industry, it is reasonable to assume that you would not make such a statement unless a carefully detailed program were already prepared for presentation.

You will be pleased to learn that when I talked to major auto companies last week they expressed sympathy with your objective in seeking a guaranteed annual wage program to "provide steady full-time employment the year around." They realize that steady income means security for the consumer and consequently more active purchasing power. They realize also that the steady production level implied by a guaranteed wage program would eliminate many profit-consuming cost penalties inherent in the irregular production levels.

Common Goal — The objective which you seek is therefore an objective which the auto companies also seek, but thus far with only moderate success. Perhaps you recall that before 1935 model changeover came at irregular periods during the year. At that time the automakers agreed to introduce their new models in the fall. The purpose of introducing new models during this time of the year is of course to bolster sales during what would otherwise be a slack period, hard on both the auto workers and the companies as well.

To some extent this voluntary attempt on the part of the auto companies to level their production through the sales lure of new models in the fall has been successful. On the average from 1929 through 1934 sales reached a peak of 34.4 per cent in the second quarter and dropped to a low of 16.4 per cent in the fourth quarter. Following the change, sales leveled out somewhat to 31.0 per cent in the second quarter and 23.1 per cent in the fourth quarter on an average. But the remnants of the pattern remained until production controls disrupted the normal supply-demand relationship in 1942. This year evidence of a return to purchasing in the spring appeared once again.

Psychology—Of course, there are understandable human reasons familiar to every auto worker which tend to make the purchase of a car most appealing in the spring. Vacations are near at hand, the outdoors beckons and the ravages of winter often leave an older car unequal to the summer tasks ahead. But the situation poses a difficult problem for the auto companies. They must either: 1. Store production for the demand period; 2. ignore the demand of many Americans for their new car in the spring; or 3. produce at peak production during the time demand is active and cut back later in the year.

The first alternative perhaps seems most reasonable, but automobiles do not lend themselves to storage as do canned goods, shoes,

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Auto, Truck Output

U. S. and Canada.

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	757,595	226,134
August	611,152	322,755
September	605,228	595,715
October	651,153	656,767
November		548,782
December		569,715
Total		5,989,509

Week Ended	1953	1952
Oct. 10	148,779	138,035
Oct. 17	152,743	138,088
Oct. 24	149,791	141,747
Oct. 31	145,311	155,037
Nov. 7	135,906	143,610
Nov. 14	129,000*	146,825

Source: Ward's Automotive Reports
*Estimated by STEEL.

etc. Not only do they consume so much space that one manufacturer estimates a car coming off his lines must be sold within one week, but a car cannot be placed into storage without thorough and costly preparation. Stored outdoors for any length of time, rain and sun quickly turn unattended new cars into old. Even if an almost unimaginably large indoor storage space were available, the cars would have to be prepared in such a manner that moisture condensation resulting from changes in temperature did not rust highly finished cylinder bores and other bare metal parts.

Controls—The second alternative is to ignore the demand of many of your own workers for a new car in the spring, forcing them to buy later in the year when production caught up with demand. Under such a plan close control of the whole auto industry with each producer allocated a certain rate of output would be mandatory. For inevitably there would be a competitive desire to overproduce during the first half to take advantage of the market created by other companies who were holding down their own production in the face of active demand. And finally, the sales success of each individual model of car would have to be closely anticipated in advance of production since a new design might be entitled to an increased share of the year's market.

The third alternative, of course, is that currently in practice—varying production to meet variations in demand. Admittedly the procedure is inefficient and costly to the auto companies as well as disturbing to the workers. Excess facilities must be purchased for the peak production period which produce below their full capacity during the remainder of the year. This equipment is fixed overhead which continues to add substantially to the cost of every automobile even during the time it is not in use.

Too Heavy—It is because of this high fixed overhead under which they presently operate that the automakers are curious about and alarmed by your statements about the guaranteed annual wage. If a wage guarantee were granted under conditions as they exist today, labor would become an extremely heavy addition to fixed overhead just as is equipment at the present time, and that is the reason for their alarm.

It is possible, of course, that one or more of the larger auto companies could absorb the cost of this increased fixed overhead for a period of time to gain competitive advantage over smaller manufacturers. Inevitably the smaller companies already jeopardized by high fixed overhead in tooling would be forced out of business and ultimately even the large manufacturer would be forced to pass on the increased production cost to the consumer. The predictable result of increased cost is a narrower market and reduced output with fewer jobs, lower income and a diminishing standard of living.

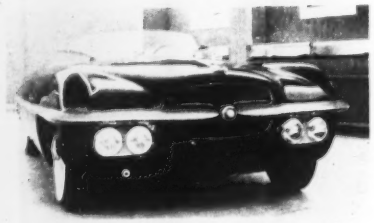
Is It Worth It?—I feel certain you are aware of these facts and recognize that under present conditions the additional cost penalties of the guaranteed annual wage would have to be added to the price of the automobile just at a time when economic conditions indicate that auto prices should be cut to stimulate demand and maintain the level of operations already reached in the automobile industry.

But as mentioned above, the auto companies are also curious concerning your research on the guaranteed annual wage question. For in your study of the guaranteed annual wage, you and your advisers undoubtedly have given careful consideration to the stabilization of auto production. Since the instability of auto production is imposing cost penalties which for the welfare of the industry should be cut during the months ahead, the auto companies would welcome a solution to this dilemma. Your stand on the guaranteed annual wage implies that you have found such a solution.

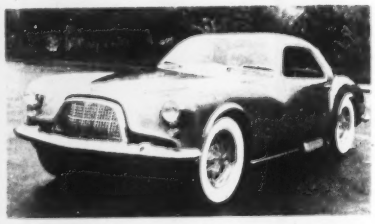
Realizing that the strength and growth of the auto companies is essential to the welfare of the workers you represent, you and your union can rise to new heights of economic statesmanship with sound plans presented now. If you have such a plan for stabilization of production in the auto industry, it is in the best interests of your members and the auto industry to bring it forth now.

Cordially,

Floyd G. Lawrence
Detroit Editor



DODGE FIREARROW

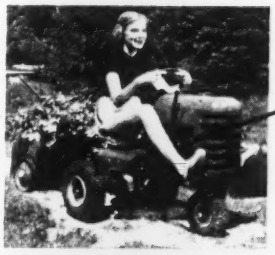


DESOTO ADVENTURER

Dreams by Chrysler Corp.

Latest champagne-set sportcars to tingle auto-buying tastes are the DeSoto Adventurer and Dodge Firearrow, designed in Detroit but with bodies by Ghia of Turin, Italy. Both "idea" cars embody features that may appear in future Dodge and DeSoto models

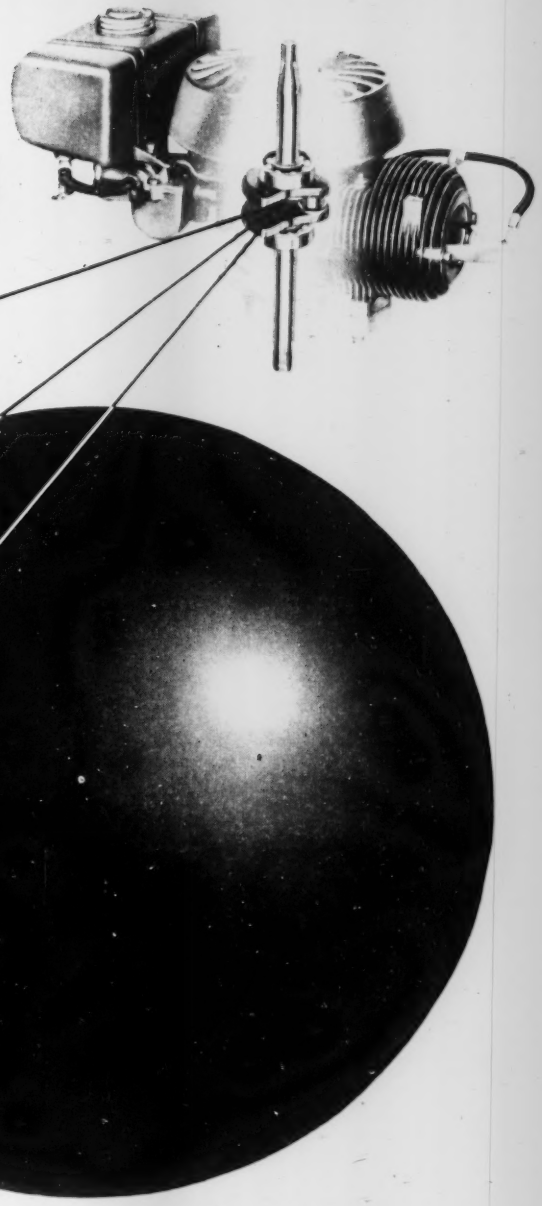
This Lightweight's a Heavy Worker!



Yard work is really fun with a Lightweight-powered midget tractor.

Cutting a tree is as easy as falling off a log . . . with Lightweight power.

Mowing a lawn is light work with 12-pound Lightweight gas engine.



Jack-of-all-trades . . . master of *every* one—that's Power Products' 12-pound Lightweight Engine! This versatile power plant has proved itself in scores of applications where light weight is a factor. Its makers credit much of its success to the New Departure ball bearings which support the crankshaft. *New Departures made 15 major improvements possible* . . . such as higher power, lower upkeep, *much* longer life!

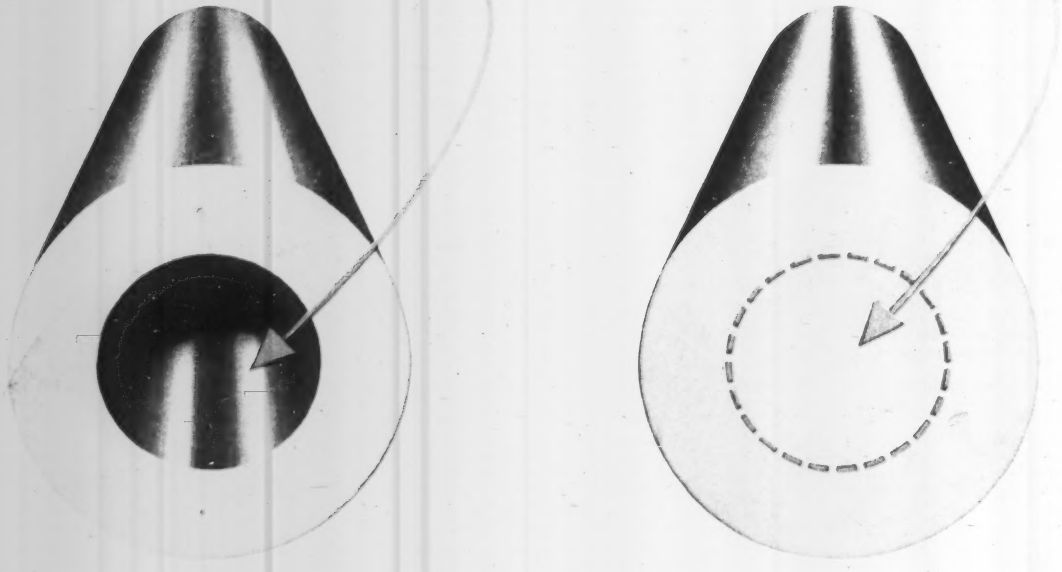
In fact, New Departures can improve *any* product that demands low-friction, rigidly accurate support of moving parts. In everything from heavy industrial to sensitive instrument applications, American business can call on New Departure's research, engineering and manufacturing facilities —most extensive in the ball bearing industry.

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Also Makers of the Famous New Departure Coaster Brake

It's cheaper to buy it... than to bore it



HOLLOW parts manufacturers can save machining time, steel and money by using Timken® seamless tubing. The center hole's already there.

Finish boring is often the first step in production. Screw machine stations can be released for other operations. You get added machine capacity without additional machines.

To help you save even *more* steel, the Timken Company's engineers will study your problem and recommend the most economical tube size for your hollow parts job — guaranteed to clean up to your dimensions.

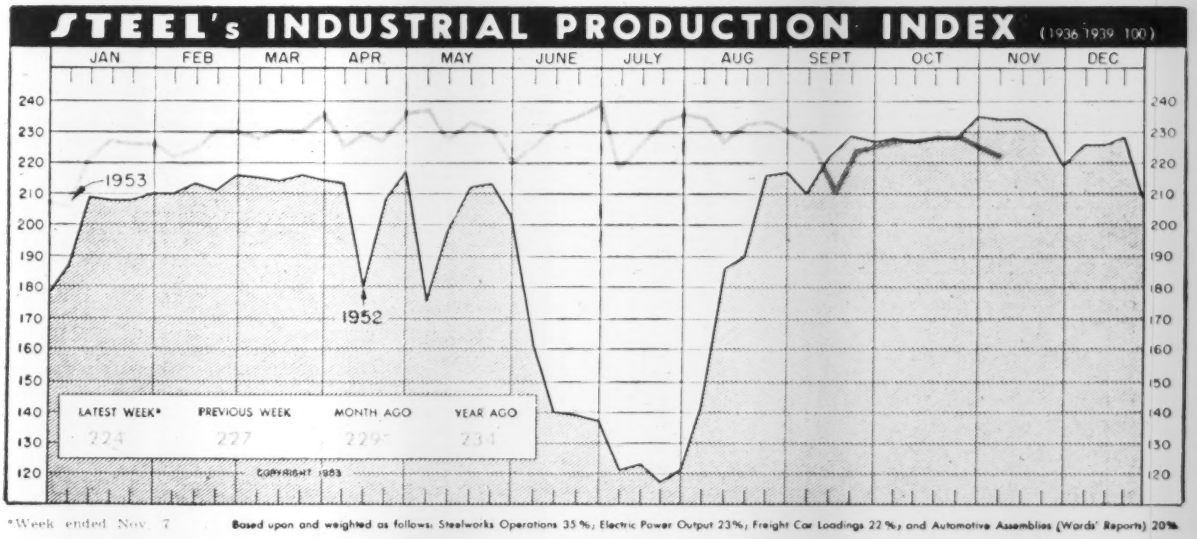
Because the piercing process by which it is made is basically a forging operation, Timken seamless tubing gives you high internal quality. It has a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal. And the Timken Company's rigid quality control keeps this quality uniform from tube to tube and heat to heat.

If you make hollow parts, why not let us help you save machining time, steel and money? Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

The Business Trend



*Week ended Nov. 7 Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%

National output of goods and services is expected to decline moderately in 1954. Increased population needs buttress long-term forecasts

SEASONAL DECLINE in industrial production, as measured by STEEL's index, continued for the second consecutive week.

During the week ended Nov. 7, STEEL's index of industrial production registered a preliminary 224 per cent of the 1936-1939 average. Output was 6 percentage points below that of the week ended Oct. 24, when the seasonal decline started, and, with the exception of holiday weeks, was the lowest since the first week of February.

Next Year's Output . . .

Even though most economic prognosticators believe that production in 1954 will be less than this year, many believe that it will be second best to 1953. And with the anticipated lapse of the excess profits tax, many corporations expect to show a net profit close to this year's level.

Management Excesses . . .

Should this expectation materialize, a closer examination is necessary to determine how prudent management has been. In looking at excess capacity, compare companies' ratios of earnings to fixed assets. Have the companies operated like the Bucyrus-Erie Co., which squeezed extra production through overtime or subcontracting, or are they caught with excess facilities on their hands?

Horn of Plenty . . .

It is difficult for management to anticipate demand when it fluctuates appreciably from year to year. In part due to the increased defense needs and the greater demand for consumer goods this year than last, the nation's total output of goods and services in 1953 is expected to be about 7 per cent above 1952, according to a survey made by the F. W. Dodge Corp.

Less Goods and Services . . .

As for 1954, the survey indicates that gross national product will decline less than 5 per cent. Construction dollar volume will be down about 8 per cent from 1953 with some part of the decline due to lower prices and to the lessening of overtime. The anticipated decline in the dollar volume of residential building will be about 7 per cent, but even with this slide a big year of more than 1 million nonfarm dwelling units is indicated.

Population Gains . . .

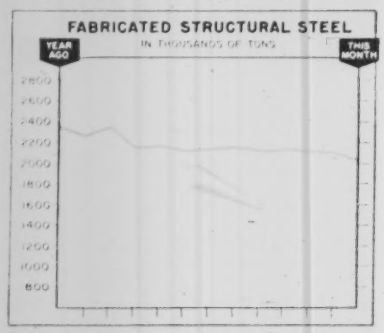
The nation's growing population, estimated at 160,730,000 in October, will provide an ever-expanding market for goods and services. During the last three and one-half years the population increased by 10 million. At this rate, the present decade will add 19 million more consumers.

Future Labor Force . . .

By 1963, the highest proportions of the population will be in the old and young age groups, the Econometric Institute Inc. says. The total in the age group 18 to 64 years, out of which comes most of the labor force, will move up only from 94,600,000 in 1953 to 97,600,000 in 1963, a rise of 3 per cent compared with the general population gain of about 10 per cent. Percentagewise this means that fewer people will be supporting more people.

Expected Income . . .

With productivity and personal income continuing to rise at the

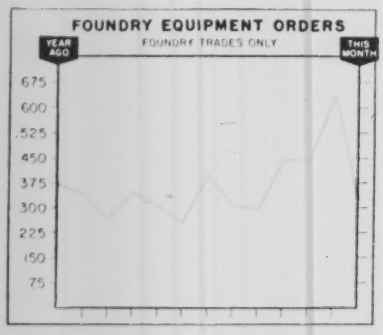


Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlogs	
	1953	1952	1953	1952
Jan.	241.4	214.9	2,450	2,416
Feb.	251.1	246.4	2,428	2,408
Mar.	266.3	268.8	2,456	2,501
Apr.	263.2	250.7	2,368	2,350
May	263.8	241.2	2,479	2,264
June	244.6	125.6	2,453	2,261
July	253.3	138.3	2,434	2,361
Aug.	241.1	226.3	2,422	2,363
Sept.	260.6	222.6	2,041	2,342
Oct.		261.7		2,266
Nov.		232.6		2,347
Dec.		226.2		2,134
Total		2,964.3		

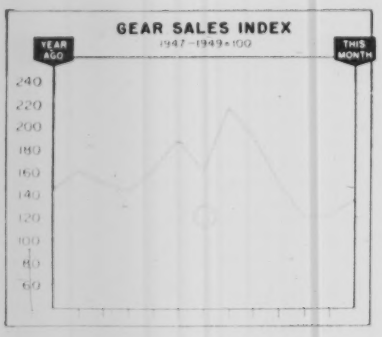
American Institute of Steel Construction



Foundry Equipment Orders

	Index (1935-1939 = 100)		Value, Thousands	
	1953	1952	1953	1952
Jan.	301.0	191.5	$1,379	$1,562
Feb.	257.3	200.4	1,179	922
Mar.	306.7	310.0	1,815	1,427
Apr.	303.0	385.1	1,395	1,773
May	294.1	225.2	1,568	1,037
June	146.8	353.8	2,308	1,629
July	140.8	243.9	2,362	1,123
Aug.	633.3	311.9	3,915	1,434
Sept.	317.2	365.9	1,676	1,685
Oct.		334.8		1,538
Nov.		258.1		1,183
Dec.		313.2		1,573

Foundry Equipment Mfrs. Assn.

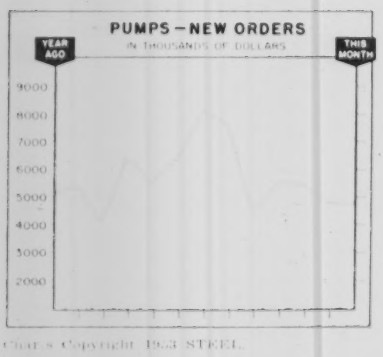


Gear Sales Index

(1947-1949 = 100)

	1953	1952	1951
Jan.	161.4	170.6	264.6
Feb.	158.1	155.5	298.1
Mar.	158.9	147.1	330.6
Apr.	217.1	148.7	342.5
May	158.8	125.9	364.6
June	146.5	152.3	300.9
July	124.7	115.3	279.1
Aug.	121.6	132.5	264.2
Sept.	135.6	143.1	250.0
Oct.		150.8	303.1
Nov.		150.9	230.0
Dec.		110.9	216.5

(1947-1949 = 100)



Pumps, New Orders

In Thousands of Dollars

	1953	1952	1951
Jan.	6,752	5,647	6,177
Feb.	6,521	6,020	6,450
Mar.	8,244	5,925	5,851
Apr.	7,748	6,351	7,263
May	4,629	6,110	6,341
June	5,600	7,957	6,562
July	6,331	6,250	8,558
Aug.	4,896	6,921	5,911
Sept.	4,815	6,258	6,562
Oct.		6,531	6,506
Nov.		6,150	5,901
Dec.		6,555	5,955
Total		71,650	80,176

Hydraulic Institute

Charts Copyright 1953 STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Nov. 2	Heaters	Sept. 21	Refrigerators	Nov. 2
Durable Goods	Oct. 12	Machine Tools	Oct. 5	Steel Castings	Oct. 19
Employ., Metalwk.	Nov. 9	Malleable Castings	Oct. 19	Steel Forgings	Oct. 19
Employ., Steel	Oct. 26	Prices, Consumer	Sept. 28	Steel Shipments	Oct. 12
Freight Cars	Oct. 26	Prices, Wholesale	Nov. 2	Vacuum Cleaners	Oct. 12
Furnaces, Indus.	Sept. 14	Radio, TV	Oct. 26	Wages, Metalwk.	Nov. 9
Gray Iron Castings	Oct. 19	Ranges, Elec.	Nov. 2	Washers	Nov. 9
Indus. Production	Oct. 26	Ranges, Gas	Oct. 12	Water Heaters	Nov. 9

present pace, this might not be too difficult a feat. Over the last half century, the productivity per man-hour of work has increased on the average of 2 to 3 per cent each year. This means that every ten years the average worker increases his "real" wages or buying power by about 25 per cent regardless of price levels, according to Walter Williams, undersecretary of commerce.

Highlights of Demand . . .

Increased demand for goods and services the youngsters and oldsters desire will result from the higher proportions in these groups. Even though the number of young people coming into the marriageable age of 18 to 24 will continue to decrease during the next three years with a resulting downturn in formation of new families, the long-term trend in the formation of family units seems to exceed the rate of population growth—simply because the size of families is decreasing. From a sales viewpoint, this is important because 100 families of 3 persons each buy more dishwashers, lawn mowers and vacuum cleaners than do 60 families consisting of 5 persons each—even though 300 persons are involved in both instances.

Speed of Electricity . . .

To meet the demands of greater population, the electrical manufacturing industry expects to increase its share of national production from 4.1 per cent in 1952 to 6 per cent in 1963, says Ralph J. Cordiner, president, General Electric Co. Breathing life into these figures, he declares that industry must be prepared to build, install and service as much electrical equipment in the next ten years as it has in the entire preceding 75 years of its history. In preparation for future growth, GE has undergone a $1.1-billion program of expansion in the ten postwar years, with 75 per cent of this sum going for new equipment and machinery made available by rapidly accelerating technology.

Fruits of Research . . .

While the national investment in research and development has

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	93.5	94.0	106.0
Electric Power Distributed (million kwhr)	8,414[1]	8,362	7,807
Bitum. Coal Output (daily av.—1000 tons)	1,521	1,546	1,544
Petroleum Production (daily av.—1000 bbls)	6,000[1]	6,028	6,612
Construction Volume (ENR—millions)	$152.8	$358.4	$195.4
Automobile, Truck Output (Ward's—units)	135,906	145,311	113,610
TRADE			
Freight Car Loadings (unit—1000 cars)	760[1]	781	829
Business Failures (Dun & Bradstreet, no.)	180[1]	218	143
Currency in Circulation (millions)[3]	$30,428	$30,268	$29,748
Dept. Store Sales (changes from year ago)[3]	2%	7%	8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,501	$17,135	$15,737
Federal Gross Debt (billions)	$273.4	$273.3	$264.9
Bond Volume, NYSE (millions)	$13.3	$19.9	$13.3
Stocks Sales, NYSE (thousands of shares)	6,253	6,789	6,632
Loans and Investments (billions)[4]	$79.5	$79.1	$77.0
U. S. Gov't Obligations Held (billions)[4]	$31.8	$31.6	$32.4
PRICES			
STEEL's Finished Steel Price Index[5]	189.38	189.38	181.31
STEEL's Nonferrous Metal Price Index[6]	204.3	204.3	214.0
All Commodities[7]	109.9	110.0	110.7
Commodities Other Than Farm & Foods[7]	111.6	111.6	112.8

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1953, 2,254,150; 1952, 2,077,610. [4]Federal Reserve Board. [5]Member banks, Federal Reserve System. [6]1935-1939=100. [7]1926-1934=100. [8]Bureau of Labor Statistics Index, 1947-1949=100.

increased from $50 million in 1940 to $3.75 billion this year, the electrical manufacturing industry has continued to be the leader in the field. An outstanding example of electronic development, the television industry, has marketed about 25 million sets to date and within five years expects to have 50 million in operation, says Allen B. DuMont, president, Allen B. DuMont Laboratories Inc.

Electrical Magic . . .

To supply enough electricity, generation was increased ten fold between 1920 and 1952. This has worked a transformation in the receiving end of America's economy—the home, says Don G. Mitchell, president, Sylvania Electric Products Co. Today, there are 42 million wired homes, 38 million refrigerators, 32 million washers and 38 million irons.

Engineers Wanted . . .

All these developments have created an ever-increasing demand for engineers. In 1900, U. S. industry as a whole employed an average of one engineer for every 250 employees. By 1952, there was one engineer or technical graduate for every 60 employees, General Electric's president, Ralph J. Cordiner, points out. And the future trend is pointed to by GE, which now has one engineer for every 20 persons.

One Good Man . . .

Among problems confronting manufacturers today is distribution. With a general shakedown predicted for the appliance industry in 1954 by John F. McDaniel, vice president, Hotpoint Co., he suggests that distributors strengthen their dealer organizations by picking one good outlet rather than three mediocre ones when they start their franchising program.

Trends Fore and Aft . . .

The $8 billion or $9 billion government deficit expected for next fiscal year will in large part answer the question as to who is going to continue the borrowing pace—industry and consumers have already reduced their demands . . . Total business inventories in September were $78.7 billion, with manufacturers' stocks accounting for $250 million out of the $600 million seasonally adjusted monthly gain.

5 GOOD REASONS for BUYING SAWHILL

Pipe and Tubing

Pipe and tubing fabrication is a specialized business with Sawhill. Purchase of prefabricated parts means a saving to you.

Sawhill carries a complete stock of pipe—standard, extra strong, double extra strong, welded and seamless—all sizes up through 20" O.D.

Pipe and tubing is fabricated to your specifications—cut to length, threaded, bent, flattened, tapped, drilled, punched, swaged, expanded, welded, etc.

Sawhill is a dependable source. Our plant is centrally located in the Youngstown-Sharon district with excellent truck and rail connections to most destinations.

Valuable space can be saved in your plant. Sawhill warehouses your pipe and tubing stock—furnishes parts as required for your production and assembly schedules.

SEND FOR FREE FOLDER

"See what you can do with Pre-fabricated Pipe and Tubing"

THE SAWHILL MANUFACTURING CO.

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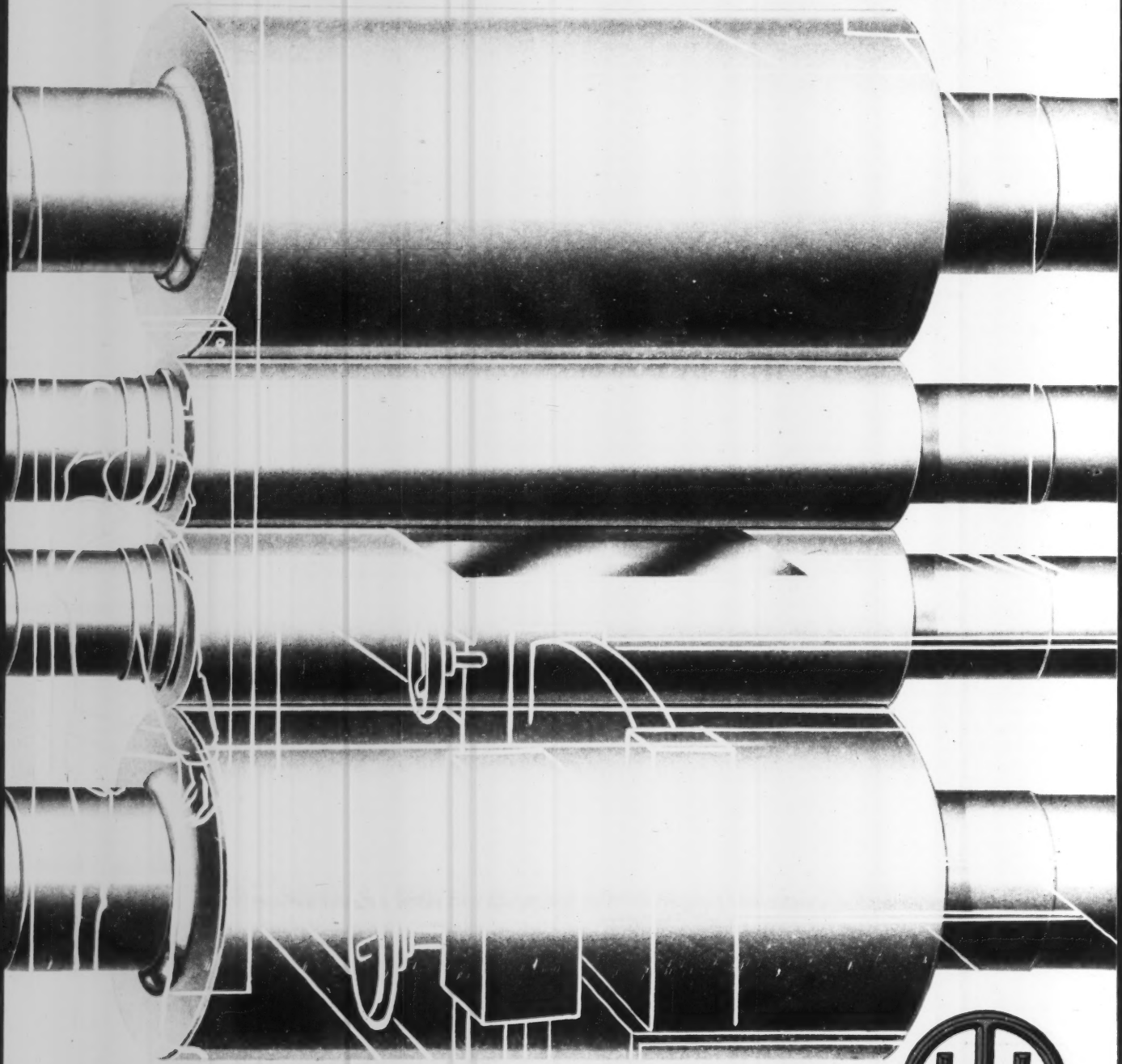
DISTRICT OFFICES: NEW YORK, CHICAGO, PHILADELPHIA, DETROIT, ST. LOUIS, HARTFORD and SPRINGFIELD, OHIO.

Representatives in Principal Cities

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Holl-O-Cast Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls
- Flintuff Rolls
- Ohio Double-Pour Rolls



THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • Plants at Lima and Springfield, Ohio

Men of Industry

WILLIAM L. LEWIS
. . . IBM vice president-purchasing

JOHN B. MITCHELL
. . . Kropp Forge gen. sales mgr.

ROBERT A. PRITZKER
. . . joins Colson as V. P.-mfg.

William L. Lewis, vice president in charge of the Endicott, N. Y., plant of **International Business Machines Corp.,** was appointed vice president in charge of purchasing for the company, with headquarters in New York. **J. W. Schnackel** was named general manager of the Endicott plant. **J. J. Bricker,** director of purchasing, was appointed director of company personnel.

Paul J. Selinger, former assistant chief, tube section, Iron & Steel Division, National Production Authority, was appointed manager of stainless tubing sales at **Standard Tube Co.,** Detroit. **J. W. Dingman** was appointed to the Detroit sales staff.

Airmatic Valve Inc., Cleveland, appointed **Henry J. Gardner** chief engineer. He recently served as design development engineer, International Business Machines Corp.

Damascus Tube Co., Greenville, Pa., appointed **Alfred B. Kerber** sales manager. He served in the same capacity at John B. Astell Co. Inc., and formerly was associated with Babcock & Wilcox Co. and Pittsburgh Steel Co.

Robert B. King was made production manager of engine machining at **Ford Motor Co.'s** engine division, Chicago.

Kropp Forge Co., Chicago, appointed **John B. Mitchell** general sales manager. He joined the company in 1948 as chief estimator, and had previously been with Pittsburgh Forgings Co.

Charles C. Cheyney was elected vice president-sales, **Buffalo Forge Co.,** Buffalo. He has been sales manager since 1945 and a director since 1949.

George W. Myers was named president, **Crucible Steel Casting Co.,** Milwaukee. He was previously works manager of the Indiana Harbor, Ind., works of American Steel Foundries. **Richard D. Colburn,** former president, continues as a director of Misco Corp., Crucible's parent company in Chicago.

Changes in sales personnel at **Fansteel Metallurgical Corp.** include **Richard I. Allen,** district manager, Detroit - Cleveland - Pittsburgh region, appointed sales manager, Weiger Weed & Co. Division, with headquarters in Detroit; **Floyd Cessna,** who moves from the Detroit office to become district manager at Cleveland; **Walter E. Bullock,** eastern district manager, moved to the Fansteel main office at North Chicago, Ill., as field sales manager; and **George G. Gorman,** who assumes Mr. Bullock's duties as New York district manager.

R. A. Pritzker joins **Colson Corp.,** Elyria, O., as vice president-manufacturing. His previous experience includes, successively, production manager of Electro Mfg. Corp., plant manager of Erie Mfg. Division, Pressed Steel Car Co., and vice president of Essex-Graham Corp., all Chicago firms.

A. William Tilder, previously vice president-general manager, Acromatic Tool Co., joined **Lamina Dies & Tools Inc.** as sales manager of its Guide Pin & Bushing Division, Bellaire, Mich. Mr. Tilder will be located at the Lamina offices in Berkley, Mich.

N. F. Diederich joins **Electric Products Co.,** Cleveland, as manager of engineering. He spent 17 years with Clark Controller Co., where he last served as manager of engineering standards.

Vanadium-Alloys Steel Co., Latrobe, Pa., elected **Dr. George A. Roberts** vice president in charge of technology. He was chief metallurgist. He now directs the research and development program.

Tom Stott was made executive assistant to the president of **Cleveland Cap Screw Co.,** Cleveland. He was vice president-sales for H. W. Harper Mfg. Co.

J. U. Shrader was made plant su-

ROBERT M. DRYSDALE JR.
. . . heads Virginia Metal Products

JOHN H. HARDING
. . . sales mgr., Hydro-Line Mfg.

DONALD L. ANDE
. . . gen. mgr. of warehouses for J&L

perintendent, **Midwest Mfg. Corp.**, Galesburg, Ill., a subsidiary of Admiral Corp. **M. D. Schnell** was appointed to the newly created post of superintendent of ranges and enameling.

Virginia Metal Products Inc., Orange, Va., which was acquired last December by Chesapeake Industries Inc., named **Robert M. Drysdale Jr.** president to succeed **Joseph A. Patrick,** resigned but who remains a director. Since joining Virginia Metal last spring, Mr. Drysdale has been vice president and general sales manager. **Carl W. Zies** was elected a director.

Carl W. Schwendener was appointed factory manager, Elgin Division, **Flexonics Corp.**, Maywood, Ill. **Fred A. Abben,** former factory manager, Savanna, Ill., division, was made industrial relations manager, succeeding Mr. Schwendener. **Richard Benton** will be factory manager at Rock Falls, Ill.

William H. Harris Jr. was elected to the board of **Micromatic Hone Corp.**, Detroit, to fill the vacancy created by resignation of **Harvey C. Fruehauf.**

Thor Power Tool Co. named **John L. MacDonald** manager of its newly opened Newark, N. J., factory branch office.

James W. Kendrick was appointed Ft. Worth, Tex., district sales manager for **Colorado Fuel & Iron Corp.**

John H. Harding was appointed sales manager, **Hydro-Line Mfg. Co.**, Rockford, Ill. He has been sales engineer since joining the firm in 1951.

Gordon J. Mitchell was made superintendent of industrial relations at **Republic Steel Corp.'s** Truscon Steel Division in Youngstown. He succeeds **Walter C. Stoner,** now an assistant superintendent of industrial relations at Republic's Youngstown steel plant.

Cleveland Quarries Co. appointed **Leslie B. Bellamy** general manager of its Sterling Abrasives Division at Tiffin, O. He has served the division as Detroit district manager.

LESLIE B. BELLAMY
. . . Sterling Abrasives gen. mgr.

Donald L. Ande, acting general manager and manager of sales, warehouse division, **Jones & Laughlin Steel Corp.**, Pittsburgh, was made general manager of warehouses to succeed **Andrew W. Herron Jr.**, retired. Mr. Ande, who has had more than 25 years' experience in the steel industry, joined J&L in 1950 as manager of sales, warehouse division.

Sharon Steel Corp. appointed **John P. Fierst** district sales manager, Cincinnati. He replaces **Paul I. Davis,** now Indianapolis district sales manager.

Mason Britton Jr. was appointed sales manager, **Cincinnati Lathe & Tool Co.**, Cincinnati.

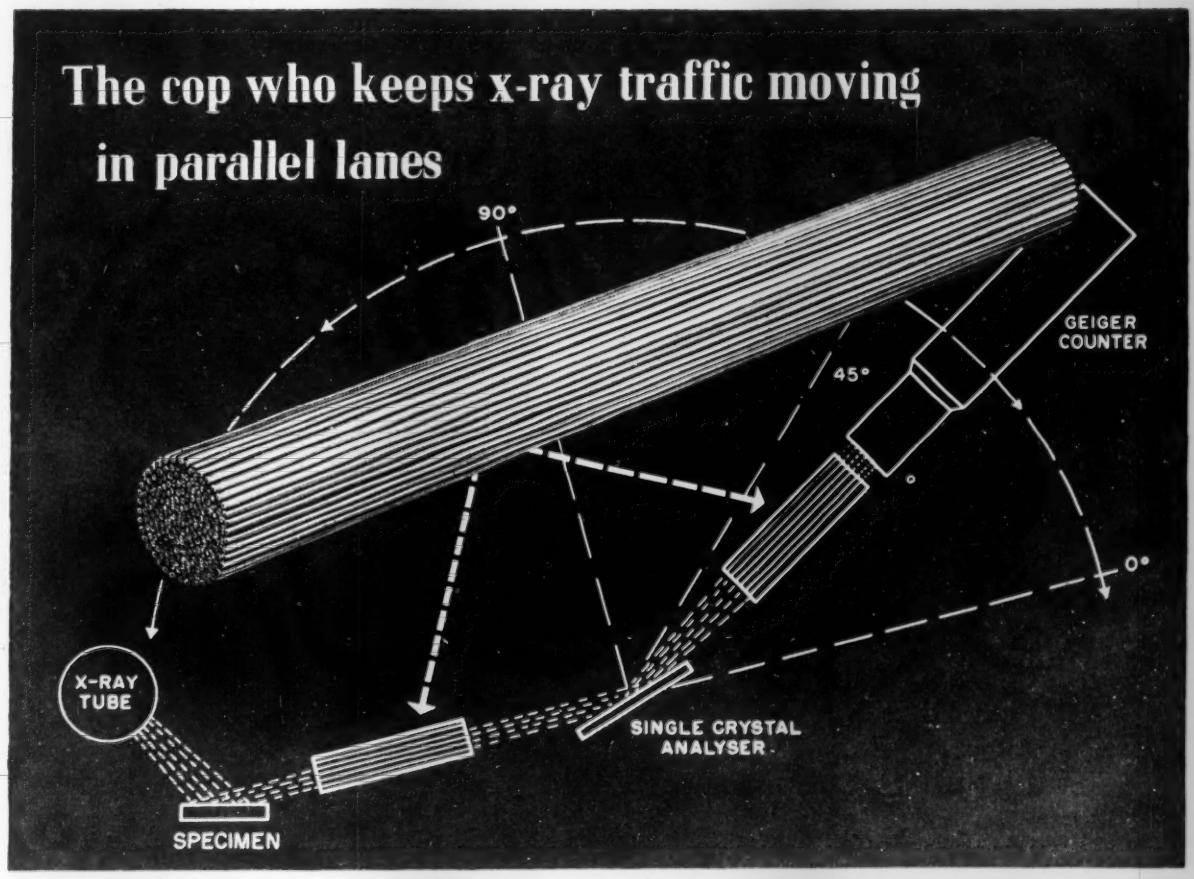
Sir Charles Bruce-Gardner was appointed chairman of the board of **British Iron & Steel Corp. Ltd.**, London, England. He succeeds the **Earl of Dudley,** retired, who served as chairman since 1935. Sir Charles is chairman of John Lysaght Ltd.

S. James Stanfield was made manager, market development, **Flexaust Co.**, New York. He was formerly assistant to the president of Flexible Tubing Corp.

James S. Kirkpatrick, research director for many years with **Brooks & Perkins Inc.**, Detroit, was elected vice president, research and development.

Newly elected to the board of **California Metal Enameling Co.**, Los Angeles, are **K. L. Carver, Denis H.**

The cop who keeps x-ray traffic moving in parallel lanes



Fluorescence analysis is the new, fast way to find out which elements and how much of each are in alloys—without destroying the sample of the alloy.

This trick is accomplished by bombarding the alloy specimen with X-rays using a Fluorescence Analysis Unit produced by North American Philips, Inc. The x-radiations of each element bounce off the specimen only to be separated according to wavelength and measured.

As the x-radiations leave the specimen they shoot through bundles of fine tubes known as "collimators". The collimator acts as a kind of traffic cop, keeps the rays moving in parallel lanes, reduces divergence. This is an interesting job, and we're pleased that North American Philips chose Superior fine nickel tubing for it on the basis of its uniformity in diameter, wall thickness and finish.

Undoubtedly you have opportunities where tubing could be helpful—as a carrier, a weight-saving structural member, or as a shape that saves machining time. Look into the variety of forms, sizes, and analyses Superior produces to tight specifications. Take advantage of the experience and testing facilities that Superior brings to focus on your problem. Tell us the nature of your application and we'll send you information and a Data Memo by return mail. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and Shaped Tubing available in Carbon, Alloy, and Stainless Steels, Nickel Alloys, Beryllium Copper, Titanium and Zirconium.

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All analyses .010" to ⅝" O.D.
Certain analyses (.035" Max. wall) up to 1⅜" O.D.

JOSEPH H. LANCOR JR.
. . . Consolidated Engineering v. p.

HARVEY V. EASTLING
. . . gen. mgr., Link-Belt Pacific Div.

HENRY L. POHNDORF
. . . National Welding Equipment sales mgr.

Grady, Raymond W. McKee and **Daniel P. O'Keefe.**

Consolidated Engineering Corp., Pasadena, Calif., announces executive promotions effective Dec. 1. **Joseph H. Lancor Jr.** will succeed **James R. Bradburn** as vice president in charge of engineering, and **Walter B. Claus** moves into the post vacated by Mr. Lancor as director of Consolidated's transducer division. Mr. Bradburn will become vice president in charge of the computer division.

Newly elected vice presidents of **Great Lakes Steel Corp.**, Ecorse, Mich., are **Ross Wilkins Jr.**, general sales manager; **E. P. Dubois**, assistant general sales manager; **H. C. Smith**, metallurgical control; **H. B. Jeffrey**, assistant to the president and assistant treasurer; **Edward W. Herbert**, treasurer; **H. D. Fenske**, transportation and steel floor division manager; and **C. W. Laufle**, alloy division.

Harvey V. Eastling was made general manager of **Link-Belt Co.'s** Pacific division at San Francisco to succeed **Ralph M. Hoffman**, retired. Since June 1, Mr. Eastling has been assistant general manager.

Burnham Adams fills the newly created position of manager-sales, field service and contract administration for **Pacific Airmotive Corp.'s** manufacturing division. Sales manager for AiResearch Mfg. Co. for the last three years, he has been active in the aviation industry for almost 30 years.

Michigan Chemical Corp., St. Louis, Mich., elected **Theodore Marvin** chairman. He continues as president.

G. F. A. Stutz succeeds **Bruce R. Silver** as manager of technical service at New Jersey Zinc Sales Co., New York. Mr. Silver is now technical assistant to the vice president.

National Welding Equipment Co., San Francisco, promoted **H. L. Pohndorf** to sales manager. He retains the position of chief engineer, a post he has held since joining the company seven years ago.

George D. Hooper, former chief engineer and plant manager of National Machine & Tool Co., joined General Electric Co.'s **Carboloy Department** at Detroit as a development engineer in its magnet materials and process development unit.

Paul C. McConnaughey was made sales manager, gas and coke division, **Koppers Co. Inc.**, Pittsburgh. For the last four years he has been assistant manager of the Seaboard plant of the division in Kearney, N. J.

H. P. Macco was made general purchasing agent for **Twain Tool & Mfg. Co.**, Evanston, Ill. He had been director of purchases of Russell Electric Co., division of Raytheon Corp.

OBITUARIES...

Arthur W. Williams, 73, retired general manager of sales, Claymont, Del., plant, Wickwire Spencer Steel Division, **Colorado Fuel & Iron Corp.**, died recently. He began his career in the steel industry in 1914 with Worth Bros. Co., continuing with that organization following acquisition by CF&I.

W. C. Stevenson, 61, retired executive of **Hickman-Williams & Co.**, Cleveland, died Nov. 5. He retired a few months ago as executive vice president.

George O. Hope, 72, sales representative, **Pressed Steel Car Co. Inc.**, Chicago, died Nov. 3.

Edmund Kinne, formerly mechanical engineer for **American Steel Foundries**, Chicago, who retired in 1946, died Nov. 2 in Miami, Fla.

David J. O'Hara, 38, vice president and production manager, Buffalo, Silver Creek and Ft. Erie, Ont., plants of **Niagara Therapy Mfg. Corp.**, died Nov. 1.

William P. Bennett, 66, chairman, **Canadian Welding Works Ltd.**, died Nov. 1 in Montreal, Que.

William H. Donner, 89, veteran steel executive, died Nov. 3 in Montreal, Que. Prior to the 1930s he headed five steel companies including **Donner Steel Co.**, Philadelphia.

Wickwire oil tempered wire . . .

STEEL RIBS FOR HEAVY UMBRELLAS, TOO

Not all oil tempered wire is used for springs. A typical example of its diversified applications is the familiar beach umbrella, also used on lawns and terraces, and in modified form on tractors, bulldozers and similar equipment.

For the steel ribs of these heavy umbrellas many manufacturers find Wickwire oil tempered wire ideal. This wire is stiff so as to retain its shape; uniform so that all wires bend the same; flexible so that the wires follow the contour of the umbrella; and ductile so that they may be easily swaged.

Wickwire oil tempered wire is available in a size range from .007" to .5625". Round wire can be supplied in coils or cut lengths. Wickwire also manufactures flat tempered wire.

High or low carbon steel . . . in all tempers, grades and finishes—For the Wire You Require: Check First With Wickwire.

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Chicago • Detroit • New Orleans • New York • Philadelphia

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Performance counts in cutting tools, too!

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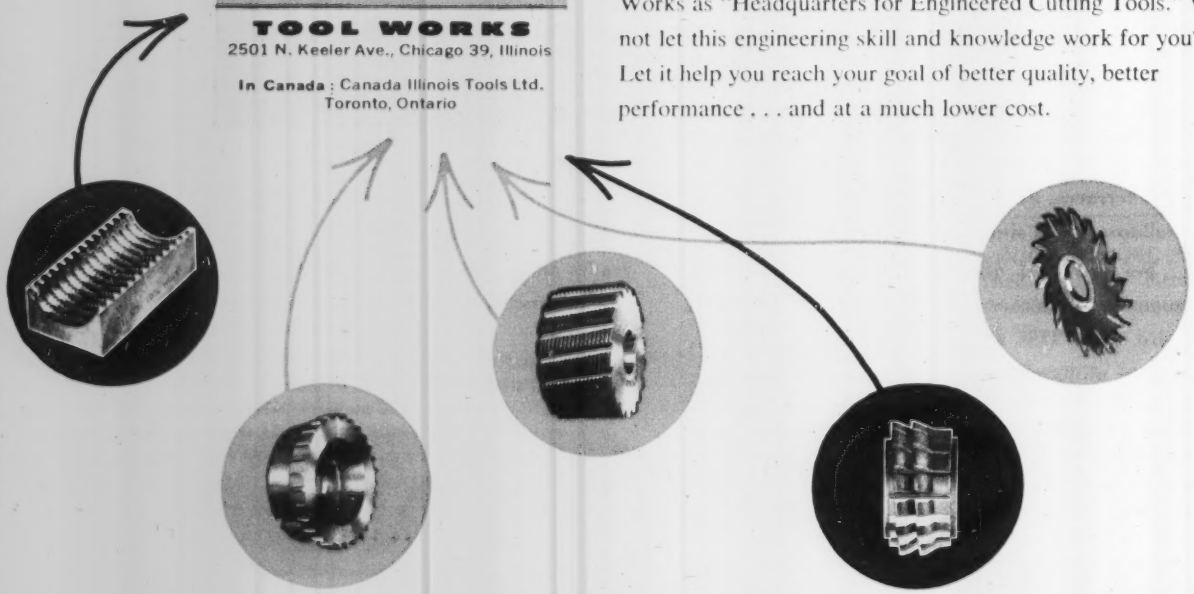
In Canada: Canada Illinois Tools Ltd.
Toronto, Ontario

One look at the championship record of Illinois Tool Works' cutting tools tells you that's the "team" that can't be beat. Here is real performance! More than forty years of leadership based on the pioneering of metallurgical and production techniques . . . a fact that has established Illinois Tool Works as "Headquarters for Engineered Cutting Tools." Why not let this engineering skill and knowledge work for you? Let it help you reach your goal of better quality, better performance . . . and at a much lower cost.



Improves Storage System

Ford installs Acme sheet metal storage system at its Aircraft Engine Division, Chicago

HANDLING AND STORAGE of hundreds of different types of alloy sheet metal required in aircraft manufacture will be faster and more efficient soon at Ford Motor Co.'s Aircraft Engine Division in Chicago. The Acme sheet storage system is being installed by Transmission Equipment Co. Inc., that city, the sales representative for Acme Welding Division, United Tool & Die Co., West Hartford, Conn.

The system operates very much like a "library" and, in a representative installation, saves around 50 per cent of the floor space required for flat storage, cuts handling time 90 per cent by eliminating all manual handling of stock, and reduces delivery lead time from 60 days to as low as one day. All stock is protected from damage in storage and handling.

"Bookmaking" — Under the "library" system, when a crate of sheet metal is received, it is placed on a welded steel transfer rack. All of this work is done by an overhead traveling crane, none by hand. Then the top of the crate is removed and a steel channel "book" hinge and one "book" cover of welded steel and plywood are connected on top. After this, the crate is turned over by means of an especially-designed hoist bar. The transfer rack and the other side of the crate are removed and replaced by the second "book" cover. The completed "book" is then swung into its proper position in vertical steel racks, immediately available when needed.

It is not essential to have all "books" in the "library" at one point. Most of them are located at one main point where all inspection, testing and some shearing are done; others are located at points handy to certain production operations. The Acme system is suitable not only for in-plant storage, but also for warehouse use, thus eliminating in-plant storage entirely.

In event that sheet stock is required at a remote point in the plant, the system includes a mobile V-rack for easy transportation of any size "book."

Plans $12-Million Project

Hughes - Foulkrod Construction Co., Philadelphia, was awarded a contract by Pennsylvania Railroad for a $12-million freight car repair center at Hollidaysburg, Pa. Work will begin at once. A $1-million scrap reclamation plant for the railroad adjacent to the repair center site is now nearing completion.

Tveter Heads Tools Institute

Martin M. Tveter, vice president, Duro Metal Products Co., Chicago, manufacturer of mechanics' hand and power tools, was elected president of Service Tools Institute, New York. He succeeds J. G. Geddes, president, H. K. Porter Inc., Somerville, Mass.

Williams Opens Warehouse

J. H. Williams & Co., Buffalo, established a warehouse at 1855 Cheshire Bridge Rd., Atlanta. The company makes industrial and automotive wrenches and tools.

GE To Build Laboratory

General Electric Co., Schenectady, N. Y., plans to construct a $1.8-million combustion laboratory as an addition to its huge research laboratory at the Knolls, near that city. It will be used to aid scientists in obtaining knowledge needed to produce more powerful gas turbines for aircraft and other applications.

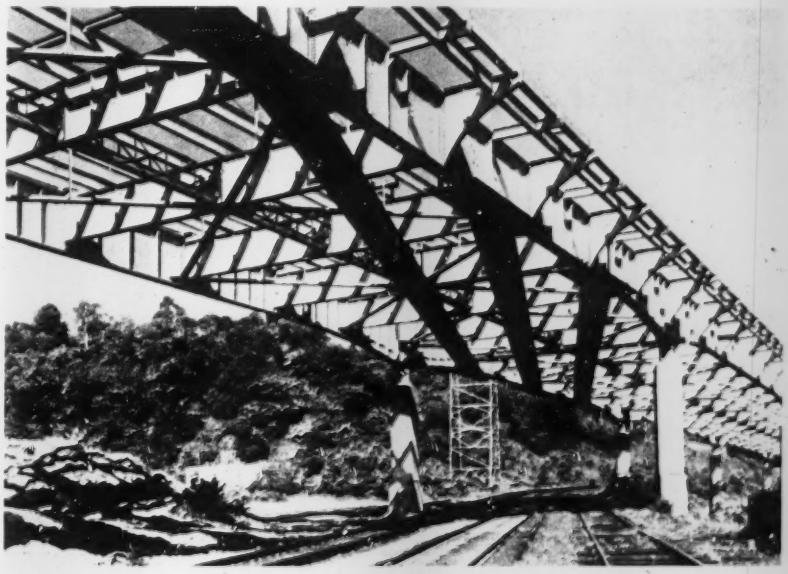
Parker-Kalon Changes Hands

General American Transportation Corp., Chicago, acquired the business and assets of Parker-Kalon Corp., New York, manufacturer of screw fastening devices. The business will be operated as the Parker-Kalon Division of General American.

Bethlehem Appoints Agent

Bethlehem Steel Co., Bethlehem, Pa., appointed Solar Steel Corp.'s Cincinnati plant, located in Sharonville, O., as sales agent in southern Ohio, Indiana and Kentucky for its line of tool steels. Herman Rittger recently was named by Solar Steel as general manager of tool

(*Please Turn to Page* 100)



Wrought Iron Safeguards Bridge Against Corrosion

An important link in the Schuylkill Expressway is the 1 3-mile long bridge which spans railroad tracks near West Manayunk, Pa. To guard critical members of the bridge against damage from corrosive steam ejected by locomotives passing under the bridge, the engineering firm specified ½-in. wrought iron for the blast protection plates shown above. Similar safeguard against corrosion is provided by 6-in. wrought iron pipe used in drainage lines of the bridge

means approval by 250,000 cost-wise buyers

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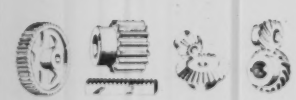
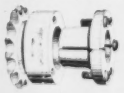
STANDARDIZED PRODUCTS

STOCK GEARS — 2000 TYPES and SIZES



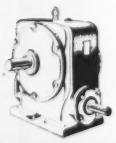
SPROCKETS and CHAIN

SHOLD-A-GRIP Interchangeable Tapered BUSHINGS and SPROCKETS



RATIOMOTORS

REDUCTORS



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1. **LEADING SPECIALISTS** in standardized machine drive parts for 75 years.
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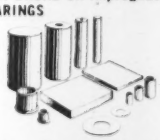

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(Continued from Page 97)
steel sales with offices at the Cincinnati plant.

Knapp Moves Into New Plant

James H. Knapp Co. moved into its new plant at 1731 Workman St., Los Angeles 31. The firm designs and manufactures industrial furnaces and melting equipment.

Federal Products Expands

Federal Products Corp., Providence, R. I., manufacturer of precision instruments for dimensional control, completed construction of its plant at 14340 Puritan Ave., Detroit. Andrew M. Grant is the Detroit branch manager.

Conduit Firm Names Agent

Pittsburgh Standard Conduit Co., Pittsburgh, appointed Fleming & Co. as its sales agents in the Kansas City territory.

Opens Scrap Processing Plant

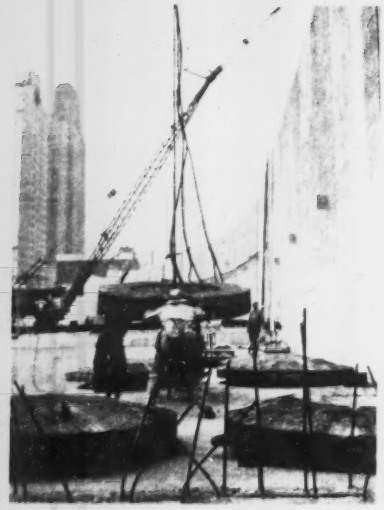
Buffalo Crushed Steel Corp. opened its new $250,000 steel scrap processing plant in Lackawanna, N. Y. The plant is built around a large crushing machine weighing more than 30 tons which crushes machine shop turnings into a more desirable form for sale to steel plants as scrap.

S & G Buys Hardware Lines

Sargent & Greenleaf Inc., Rochester, N. Y., purchased the sash and door hardware lines of United Specialties Mfg. Co., Haddam, Conn. The hardware will be manufactured in Rochester, supplementing S & G's own line of hardware, says Harry C. Miller, president of the Rochester firm.

Sheffield Has Cavitron Rights

Sheffield Corp., Dayton, O., will design, manufacture and market Cavitron machine tools. The announcement was made jointly by Cavitron Corp., Long Island City, N. Y., and Sheffield. While both firms will join in marketing the machine abroad, Sheffield has exclusive distribution rights for the United States and Canada. Cavitron Corp. will continue to produce the ultrasonic transducers and generators and will issue licenses for the process through Sheffield. The Cavitron machine tool utilizes an ultrasonic vibrating head and an inexpensive tool (such as soft steel) for the precision cutting of hard and brittle materials, either ferrous or nonferrous.



Job for Atlas

Base plates are set as first step in erecting steel skeleton for the Prudential building in Chicago. Workmen of American Bridge Div., U. S. Steel Corp., guide a 10-ton disc into place. About 31,000 tons of structurals will be used in Chicago's newest skyscraper

Kortick Mfg. Co. Moves

Kortick Mfg. Co. moved its office, plant and warehouse to 5600 Third St., San Francisco 24.

Valve Firm Changes Hands

Rensselaer Valve Co., Cohoes, N. Y., was sold to a New York city investment group. The sale was announced by the Neptune Meter Co., New York, which has owned the Cohoes firm since 1948. The purchasers, headed by David Berdon and Jay Levine, say they plan to continue operations of the plant without change.

Forms Electronics Division

Onondaga Pottery Co., Syracuse, N. Y., created an Electronics Division to diversify its business by entering a rapidly growing field of civilian business. It also strengthens the company's status in the electronics field in case a national emergency results in the reactivation of Onondaga Pottery's defense production.

Adamas Names Representative

Adamas Carbide Corp., Harrison, N. J., manufacturer of standard carbide tools, tool tips, dies and wear parts, appointed Gopher Drill & Tool Co., Minneapolis, as its representative for the state of Minnesota.

Offers Stainless Steel Items

Armco Steel Corp., Middletown, O., and G. O. Carlson Inc., Thorndale, Pa., appointed Viking Steel Co., Cleveland, as warehouse distributor for their stainless steel products.

Tool Firm Enlarges Service

Spiral Step Tool Co., Chicago, acquired carbide form tool grinding equipment business of Corlett-Turner Co., that city. Spiral Step Tool has been engaged primarily in the cutting tool business.

Christenson Heads Institute

Frank Christenson of Refractory & Insulation Corp., New York, was re-elected president and chairman of the board of Industrial Mineral Fiber Institute Inc., New York.

Kinney May Change Status

New York Air Brake Co., New York, will merge with Kinney Mfg. Co., a subsidiary, if the proposal is approved by stockholders. Kinney manufactures vacuum pumps and will retain its identity and continue to function as an independent unit with its own manufacturing and sales organization.

Follansbee To Build Warehouse

Follansbee Steel Corp., Pittsburgh, plans to construct a warehouse in Wallingford, Conn., scheduled to be completed about June 1, 1954. Costing approximately $750,000, the structure will comprise 54,000 sq ft, more than three times the size of the firm's present plant in Fairfield, Conn. Customer service will be facilitated

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2 Models
17½ to 25 Tons
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TRUCK CRANES
5 Models
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3 Models
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50 to 135 Ft. Booms

You can't beat BROWNINGS *on these jobs*

HEAVY MATERIALS HANDLING

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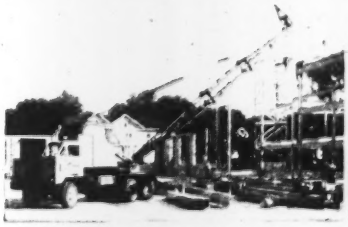
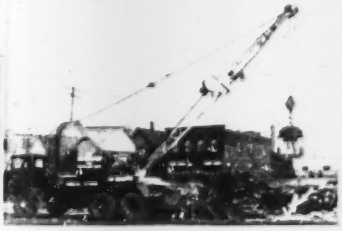
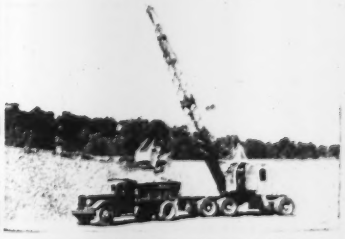


STEEL ERECTING



SCRAP YARD PICK-UP

RAILROAD MAINTENANCE



SAND AND GRAVEL LOADING

Browning builds the only complete line of cranes for all heavy-materials handling

TRUCK CRANES with independent control of each function *separately or simultaneously* on all models. High-speed maneuverability in worst conditions. Short wheelbase for operation in close quarters.

SELF-PROPELLED WAGON CRANES, originated by Browning. Rubber-mounted, one man operation, with the power, smoothness and versatility to operate efficiently and economically on a wide variety of crane work.

DIESEL AND TORQFLO LOCOMOTIVE CRANES with unequaled power for switching. Fast, easy controls for maximum productive operation. Rugged design and construction for year-in, year-out dependability.

BROWNING can recommend, and deliver the *right* crane model for your job. Our fifty-four years' experience as crane specialists is yours for the asking. Write us for complete information.

THE BROWNING CRANE & SHOVEL CO.
Dept. J, 16226 Waterloo Road, Cleveland 10, Ohio

BROWNING
LOCOMOTIVE, WAGON TRUCK AND CRAWLER *Cranes*

KX-99

PROVED IN SERVICE

15 LEADING STEEL COMPANIES
USE A. P. GREEN **KX-99**

CHECK THESE OUTSTANDING PROPERTIES OF KX-99

1. Special high fired, Missouri super duty fire-clay brick.
2. No sign of carbon monoxide disintegration in 1000 hour test at 900° F.
3. Apparent porosity in the range of 8 to 12 per cent with an average of 10 per cent.
4. Bulk density in the range of 2.30 to 2.40 grams per cubic centimeter.
5. Average modulus of rupture 1800 to 2500 pounds per square inch.

KX-99 Blast Furnace Brick are manufactured to extremely close tolerances . . . uniform in dimensions . . . free from warpage.

A P Green REFRACTORY PRODUCTS

KX-99 Blast Furnace Brick are recommended for Complete Blast Furnace linings, Hot Metal Mixers and Hot Metal Cars. They were developed to meet the service requirements in the Steel Industry. They resist carbon monoxide disintegration, slag action, chemical action and abrasion.

For detailed information on service and specific recommendations—contact your local A. P. Green Representative or write

A. P. GREEN FIRE BRICK COMPANY
Mexico, Missouri, U. S. A.

In Canada
A. P. GREEN FIRE BRICK COMPANY, LTD.
Toronto 15, Ontario

DISTRIBUTORS IN THE PRINCIPAL CITIES OF THE WORLD

by 10-ton cranes, slitters, shears, edging rolls and roller leveling and cut-up lines. L. E. Larson, New England district manager, will be in charge of the new plant.

American Locomotive Builds

American Locomotive Co., New York, is building a $400,000 warehouse and office building at Bingham avenue and Ray street, St. Louis.

Reliable Forms New Division

Reliable Spring & Wire Forms Co., Cleveland, established a Small Order Division as part of its expansion program. John S. Pabijan is manager of this division which will devote its attention to giving customers fast service on small quantities of springs, wire forms, clips and spring stampings.

Tool Mfg. Division Moved

Motch & Merryweather Machinery Co.'s Tool Mfg. Division, under the management of D. M. Hallier, now occupies quarters in the firm's plant at 1150 E. 222nd St., Euclid, O. Designed for its Used Machinery Division, which also is headquartered there, this building has been greatly enlarged for its double purpose.

Tool Firm Appoints Agent

Quijada Tool Division of Gaines-Collins, Los Angeles maker of automatic pipe cutting and threading machines, named W. F. Obear & Son as its western factory sales representatives. Obear also handles a line of special cutting and threading machines, including abrasive saws and rolling cutters which the firm manufactures.

Korhumel To Make Siding

Korhumel Steel & Aluminum Corp., Milwaukee, has been granted exclusive right to manufacture and sell curved face tension type aluminum siding under the Kinghorn patents, an arrangement previously enjoyed by Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif. Marketing and distribution on a national scale will be handled by one of Korhumel's subsidiaries, Federal Building Products Corp., Milwaukee.

Constellations Readied for Place in Skies

Largest quantity of Super Constellations ever assembled in one shot fills a section of Lockheed Aircraft Corp.'s property at Burbank, Calif., evidencing that production of the huge transports is at an all-time peak. These long-range transports dwarf the Lockheed trainer shown in the lower right-hand corner. In addition to an undisclosed quantity of military orders, the firm has a commercial transport backlog of about $150 million, placed by 18 airlines

Ryerson Enlarges Warehouse

New building construction, which will increase capacity about 50 per cent, is nearing completion at Joseph T. Ryerson & Son Inc.'s plant at 203 Westside Ave., Jersey City, N. J. The addition will be used for improved service on structural steel, for greatly expanded reinforcing steel operations and for sheet and strip work. New equipment includes machinery for sawing, shearing and bending steel to customers' requirements. William O. Springer is plant manager.

Ipsen Opens Detroit Branch

Ipsen Industries Inc., Rockford, Ill., manufacturer of automatic heat treating equipment, opened a sales and service branch at 10600 Puritan Ave., Detroit. Robert W. Krogh is the sales engineer at the new office.

Billings Buys Pexto

Billings & Spencer Co., Hartford, Conn., purchased the majority of common stock of Peck, Stow & Wilcox Co., Southington, Conn. Roland J. Ahern is president of Billings; Mark J. Lacey, of Pexto. The Pexto board of directors resigned with the exception of Mr. Lacey and Samuel G. Wilcox, executive vice president. Billings is a manufacturer of hand tools and produces precision drop forgings. Pexto manufactures mechanics' hand tools and machines and tools for the sheet metalworking industry.

Equipment Firm Changes Name

Herr Engineering Co., Warren, O., changed its name to Herr Equipment Corp. The firm designs and builds strip handling equipment.

GE Forms Two New Divisions

General Electric Co.'s Trumbull Electric Department, Plainville, Conn., has been expanded into two new departments: Distribution Assemblies Department and Trumbull Components Department. The Distribution Assemblies Department will manufacture at seven plants such products as switchboards, panelboards, distribution systems and motor control centers. Elmer T. Carlson is general manager of this department.

Trumbull Components Department will manufacture at Plain-

How to Save on STAMPINGS

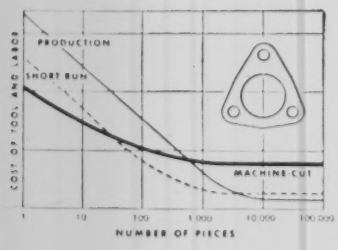
A COST-SAVING, VERSATILE APPROACH TO THEIR MANUFACTURE

Possibly you've always thought that a quick look at the quantity involved decides how a stamping shall be made. Sometimes it is done that way but it isn't the sure way to lowest costs.

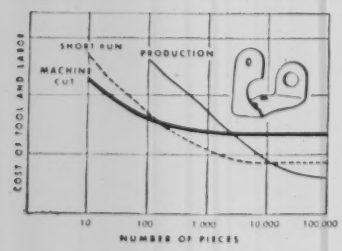
A more scientific approach by the STAMPINGS DIVISION of the Laminated Shim Company in Glenbrook, Connecticut frowns on the term "short run stamping." There is what is known as the short run *method* but there is no definite dividing point between short run and production quantities. Contour, tolerances, material, many other items all affect the manufacturing method when costs are being carefully figured.

NO ONE METHOD IS ALWAYS CHEAPEST; THREE ARE NEEDED

Machine-Cut Method: The STAMPINGS DIVISION goes one step further than Short Run and Production Methods. The Machine-Cut Method, though not strictly a stamping operation is a valuable addition to stamping procedure. Custom built slitters, cutters, saws and files use experience-gained techniques to fashion the smaller quantities of parts. No dies are made; only stock punches are used. Obviously labor cost is understandably high but there is no tool charge.



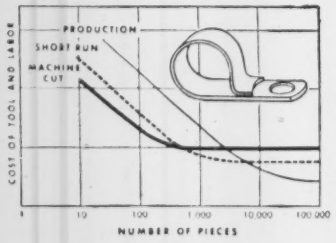
Short Run Method: As quantities increase (and depending upon the complications of contour, material, etc.) the economy of a temporary blanking die must be considered to eliminate the labor expense of machine-cutting. When this point is reached, manufacture is by the Short Run Method and the blanking is supplemented by other bench press operations. Here labor cost is at a medium level but a modest tool charge is incurred.



Production Method: As quantities increase the Production Method using standard dies with high speed automatic presses becomes more attractive. A relatively high tool charge can then be amortized over a great number of parts. Labor charge is negligible.

The Production Method as developed by the STAMPINGS DIVISION is offering unusual cost saving possibilities because of the new low-cost, full service Hecht-type die developed by the company for certain applications.

It is interesting to note that sometimes a very small quantity of parts would require a standard die because of complications or close tolerances or tough materials involved. Thus occasionally a very small quantity goes into the production classification.



LOWEST COST IS ASSURED WHEN SUPPLIER HAS ALL THREE METHODS

The illustrations show typical stamped parts along with relative costs and breaking points for each of the three manufacturing methods. Unless a supplier can offer all three, his costs cannot always be low. For a given quantity, only *one* method can be most economical.

ONE OR ONE MILLION PARTS FROM SAME SUPPLIER

An important corollary to the above is that an experimental part in small quantities can be handled by the same supplier when full production quantities are needed.

Further, it is important that a supplier be fully informed, if possible, on later or total requirements for a given part. As the charts point out, such information will affect manufacturing method and make possible cost reductions.

FURTHER INFORMATION AVAILABLE

An illustrated 12 page brochure describing in greater detail the methods mentioned above is available on request to the

STAMPINGS DIVISION
Laminated Shim Company, Inc.
3111 Union Street, Glenbrook, Conn.

ville such products as safety switches, circuit breakers and service entrance devices. Hershner Cross is general manager of this department.

Arms Franklin Liquidating

Arms Franklin Co., Youngstown, steel plant equipment maker, filed an involuntary petition in bankruptcy. Lloyd L. Dalbey, secretary-treasurer of the firm, was named receiver.

Iron Works Changes Hands

Sumner Iron Works, Everett, Wash., manufacturer of pulp, paper, shingle and sawmill machinery, was sold to Canadian Sumner Iron Works, Vancouver, B. C. The new owner will continue to operate the Everett plant.

Ohmite Opens Plant

Ohmite Mfg. Co. moved into its new plant at 3601 Howard St., Skokie, Ill. Manufacturing operations will also continue at the old plant at 4835 Flournoy St., Chicago.

Michigan Oven Names Agent

Michigan Oven Co., Detroit, appointed Marin-Mercier Co., Rochester, N. Y., as its representative in that territory. The company makes industrial ovens.

Nickeloid Moves Branch

American Nickeloid Co., Peru, Ill., moved its New England sales office to 250 Bolyston St., Boston. The company manufactures preplated metals in sheets and coils. John F. Schoellhorn is in charge of the Boston office.

Porter International Formed

Paul R. Porter, former head of Mutual Security Agency European program, organized Porter International Co., with headquarters at 1025 Connecticut Ave., NW, Washington, to develop overseas production of American products through licensing agreements between firms here and abroad. First emphasis, he says, will be placed on arranging European

35% SAVINGS IN LABOR
REPLACES 6 OLDER MACHINES
PAYS FOR ITSELF IN 9 MONTHS

Another typical

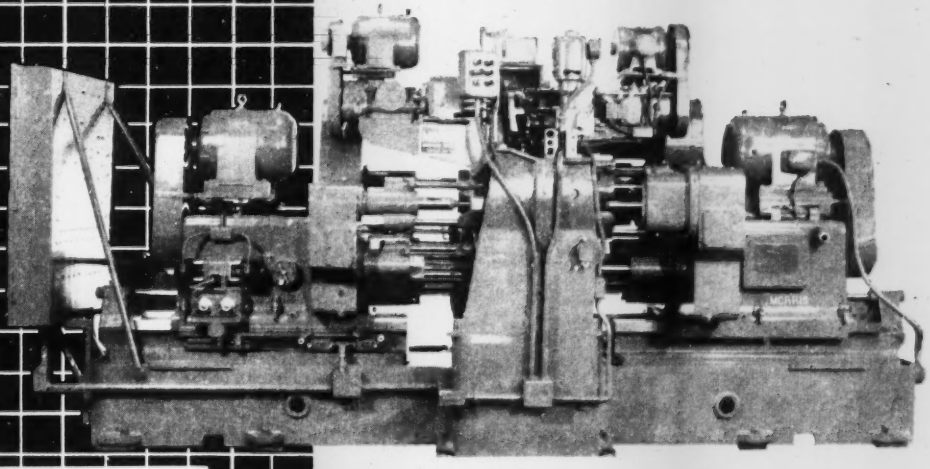
Morris

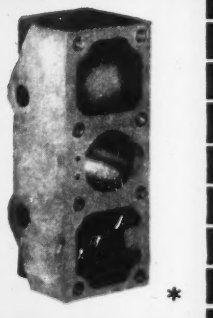
MOR-SPEED
production machine
performance record

The two way horizontal, eight station, automatic indexing machine illustrated drills, reams, countersinks, forms radius and taps 187 refrigeration unit cylinders per hour.

This unit is equipped with nineteen drilling spindles, fourteen countersinking spindles, four counterboring spindles, one reaming spindle and eleven tapping spindles. Twenty spindles are in the left hand head and eighteen in right hand head.

If your work requires numerous operations on a mass production basis, consult us. Our engineers are eager to serve you.





OPERATIONS PERFORMED:

Drill, countersink and tap 8, $\frac{1}{4}$"—28 tap holes

Drill, ream and chamfer both ends of $1\frac{1}{8}$" hole

Counterbore for $\frac{3}{8}$" dia. segment

Drill, countersink and tap 1—$\frac{3}{8}$ tap hole

Drill, countersink and tap 2—$\frac{3}{8}$—24 tap holes

*Refrigeration Unit Cylinder

Collins MOR-SPEED Unit

Morris

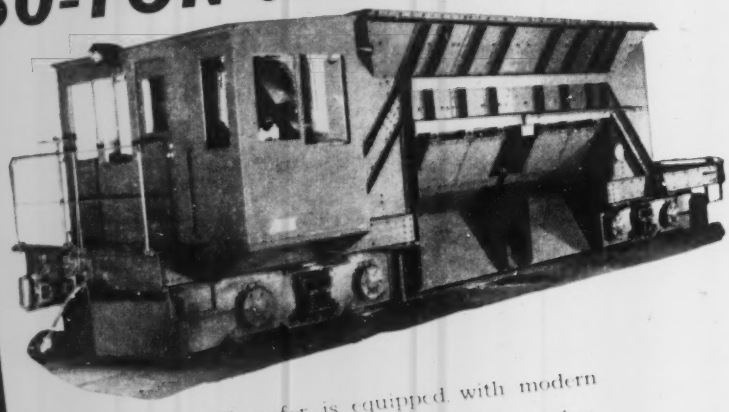
THE MORRIS MACHINE TOOL CO.
941 Harriet Street, Cincinnati 3, Ohio

"A Better Product at Less Cost with PRECISION PLUS PRODUCTION."

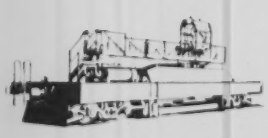
of the "HIGHLINE"
ATLAS ore transfers

We've been building transfers longer than we care to remember . . . most of them are still running. They are the "Star" performers on the highline. We're proud of their ability to meet specific performance requirements of our customers.

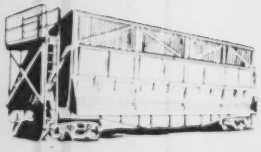
50-TON ORE TRANSFER



This Atlas Ore Transfer is equipped with modern hydraulically operated discharge gates and brakes. Steel plate trucks are provided. The cab is overhung at one side to give the operator a line of vision alongside the car. The car is equipped with electric space heaters.

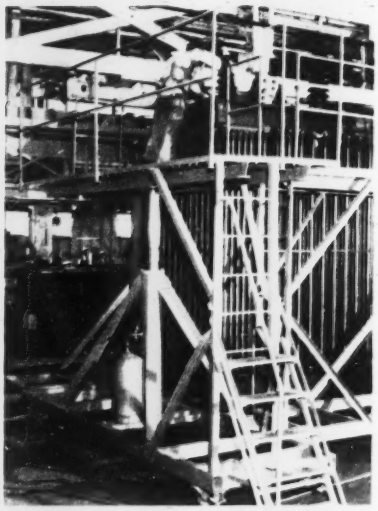


Scale Cars



Coke Quenchers

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.



Speeds Assembly Work

Six adjustable platforms, like the two shown above, are used at the Sunnyvale, Calif., plant of Westinghouse Electric Corp. to aid in assembly of power transformers. A hydraulic lift is used to adjust height of each platform from 6 ft 3 in. to a maximum of 10 ft

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manufacture of replacement parts for American military equipment of the North Atlantic Treaty Organization. Mr. Porter's directorate includes a number of businessmen, bankers and former government officials who are conversant with European needs and business opportunities.

Heldor Mfg. Corp. Moves

Heldor Mfg. Corp. moved its plant and offices to 238 Lewis St., Paterson, N. J. The firm makes transformer cans and complete can and terminal assemblies.

Rea Opens Research Plant

J. B. Rea Co., Santa Monica, Calif., moved into a new 22,000-sq-ft plant for research and development on automatic controls for military aircraft, guided missiles, underwater torpedoes, submarines and helicopters.

Cleco Appoints Distributors

Cleco Pneumatic Tool Division, Reed Roller Bit Co., Houston, appointed two distributors for its tools and accessories in New Jersey: J. Schlank Co. Inc., Harrison, and Allied Equipment & Supply Co., Bayonne.

CLEARING Harvests a Bumper Crop

One million bumpers a year are supplied to Western automotive assembly plants by United States Spring & Bumper Co., Los Angeles. A husky reason for this production is the 1900 ton Clearing double action press, shown here, which forms up to 300 bumpers per hour from stock up to .120" thick.

Specializing in the volume production of heavy-duty steel parts, United States Spring & Bumper Co., utilizes Clearing press equipment for many of its operations. If you have a similar job to do, follow the lead of the masters of mass production, specify Clearing. The assistance of Clearing press engineers is at your service. Get in touch with them today.

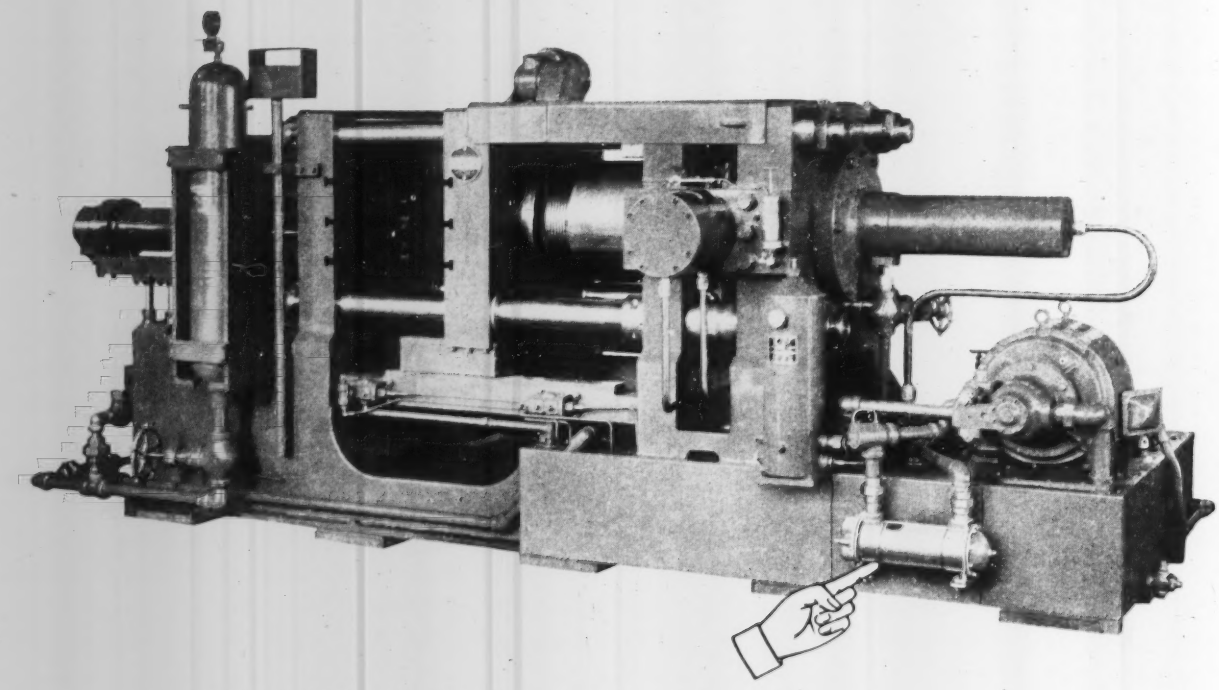
CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CMC

CLEARING MACHINE CORPORATION, 6488 West 65th St., Chicago 38, Illinois • HAMILTON DIVISION, Hamilton, Ohio

controlling oil temperature to insure steady holding pressures



in Wedgelock Die Casting Machines

New, but exhaustively tested, this Wedgelock Die Casting Machine has been designed, according to its maker, to maintain steady shot cylinder pressures from 20,000 to 40,000 lbs. with practically no maintenance.

To hold hydraulic oil temperature in check, Cuyahoga Industries, Inc. factory-installs Ross Type BCF Exchangers. Correct oil viscosity is thus insured . . . and lost pump capacity through slippage is most effectively prevented!

Regularly furnished as integral components of numerous types and makes of hydraulic equipment, Ross Exchangers are widely preferred for both high thermal efficiency and rugged dependability.

Completely pre-engineered and fully standardized, all copper and copper alloy Ross Type BCF Exchangers are carried in stock to meet most requirements.

For more information, request Bulletin 1.1K5

ROSS

EXCHANGERS

KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

1431 WEST AVENUE • BUFFALO 13, N. Y.

In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Technical Outlook

ALTERNATE ALLOY— Iron-base alloy, substitute for chromium-nickel stainless used in the reinforcing braid of Signal Corps lightweight communications cable, has been developed by Battelle Memorial Institute, Columbus, O. Announced at a meeting of the Wire Association in Chicago last week, it has moderate corrosion resistance, good workability, low electrical conductivity and is not easily magnetized. Manganese and copper take the place of nickel and much of the chromium.

EASIER TO HANDLE— Actane 33, powder that is said to present no storing or handling problems, is viewed as a replacement for hydrofluoric acid by Enthone Inc., New Haven, Conn. It can be used in most metal-pickling operations.

IN THE WIND— Small, self-contained sources of x-rays that will do away with bulky equipment are in the developmental stage at Armour Research Foundation of Illinois Institute of Technology, Chicago. Dr. Leonard Reiffel, the inventor, says source operates on the Bremsstrahlung principle: Small quantity of radioactive material is surrounded by a layer of heavy metal. Beta rays penetrating the metal are changed into x-rays. Radiation is turned off by replacing metal shell with a sheath of plastic that absorbs beta rays without forming x-rays.

NICKEL ALLOY FOR SALE— Heat resistant alloy, NA22H, product of the National Alloy division, Blaw-Knox Co., Pittsburgh, is said to be generally available. It can be used at temperatures up to 2200° F.

TESTING TIP— Nondestructive testing is expected to get a boost from xeroradiography (pronounced zero radiography), an advanced technique in x-ray. Principle: Static electricity arranges a fine-grain powder on a specially coated aluminum plate and produces an x-ray like image. Advantages: Dry plate is re-usable. Image is viewable in 45 seconds, as compared to 1 hour processing time for x-ray. If permanent record is wanted, image can be photographed. Lastly, new x-ray equipment is not needed. Cleveland research division of Aluminum Co. of America is field testing in co-operation with General Electric and the Haloid Co.

KEEP TABS ON THIS— Feasibility of using low frequency, induction method of heating steel billets from room to rolling temperatures is being studied. Set up to operate on 60 cycles at 460 volts, experimental equipment will handle 1500-pound billet in sizes up to 13 x 13 x 30 inches.

If the method comes up to production standards, planners see several advantages: Lower installation cost, ease of control, cleanliness of operation, reduction in scale loss and smaller space requirements. Geco Inc., Cleveland, General Engineering Co., Toronto, Ont., and West Penn Power Co., Pittsburgh, are making test runs in the latter's substation in Uniontown, Pa.

PREDICTING FAILURES— Stress-sensitive corrosive medium that reveals potential points of failure in steel structures is being researched at New York University. Work is based on fact that rust forms first at areas under high stress.

COMING SOON— New paint heating system is about to be announced by Fostoria Pressed Steel Corp., Fostoria, O. Particularly suited for large multi-color and multi-station installations, such as auto plants, it has a master heating unit that heats and circulates water through a closed system to any number of spray booths in a given area. To bypass fire hazard, master heating unit is outside spray area. Conventional heater paint circulating pump is eliminated by a hot water heating jacket over paint hoses.

Metalworking Outlook—p. 61 *Market Outlook—p. 169*

Windowless factory area helps keep out dust and cuts maintenance costs. Artificial lighting during three daily shifts provides single visual standard for inspection—a must for quality control

Design for Better Quality

You can practically eat off floor at new A. O. Smith plant near Lancaster, Pa. Built-in maintenance features plus good housekeeping practices spell quality control

TO MAINTAIN what it terms the nearest thing to a perfect quality welding electrode manufacturing process, the A. O. Smith Corp., Milwaukee, has devised extraordinary housekeeping methods in its newly opened eastern electrode plant near Lancaster, Pa. (See STEEL, Oct. 12, p. 92.)

Like the broomstick-wielding hausfrau on the kitchen cleanser can, the system inside and out of this 41,000 sq ft $1 million plant concentrates on chasing dirt; for it is the impurity underfoot or airborne that tends to contaminate the product.

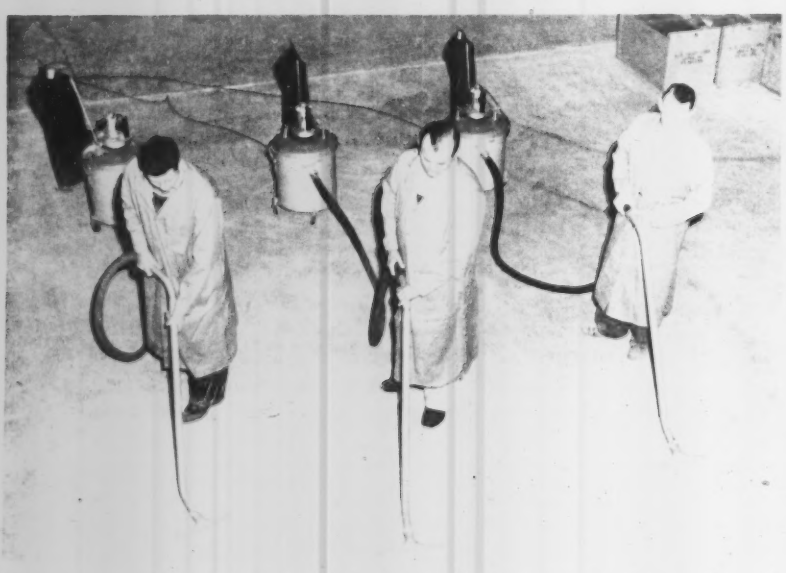
As a result, if ever there was a plant qualified to serve a meal on its floor, this is it.

Other Facets—Corollaries to the system are the exceedingly low maintenance needs of the building and the carefully planned working environment.

Even community relations have not been overlooked, with provision for the complete filter-neutralization of all air exhausted from the building, even though its locale is a rural one. Grass has been planted and shrubs spotted about the unused portions of the 10-acre site.

All the care to eliminate dirt and ease housekeeping is predicated on the fact that electrode manufacture can be a grubby business, what with the mixing of various dry materials for coatings, the drying and brushing of these coatings and the elimination of sludge and other residue elements of the mix.

Structural Angles—So in its exterior treatment, the Lancaster plant has a windowless factory area, the better to control the interior atmospheric conditions. Such exterior trim as exists—of-



Brooms are taboo. Every foot of the production area is vacuum-cleaned every 24 hours. Positive air pressure in plant prevents dust infiltration

fice windows and fascia at the top edge of the building—are of maintenance-free aluminum.

On the inside, glazed tile walls resist adherence of dirt, consequently require infrequent washing down. Every foot of the production area is vacuum-cleaned every 24 hours, some 16 man-hours per day being devoted to this chore. Use of brooms is taboo.

Even toilet bowls in rest rooms and the metal partitions housing them are wall-mounted so that the entire floor surface can be easily washed or vacuumed. A 24-hour evacuation of air in all the employee lockers is designed to eliminate effluvia or dust.

Controlled Handling—Raw materials are handled by pallet load and lift truck largely, again reducing the stirring of dust from bags of dry materials. Everything that can be kept off the floors is stowed in a manner that keeps corners free and easy to clean. A "lazy Susan," or circulating platform loaded with the various elements or raw materials, serves the dry mixing and weighing station; this device minimizes the gross storage of materials adjacent to the critical quality control areas where impurities in the air could destroy the value of whole batches of electrode coatings.

Because initial stages of electrode production (dry mixing, weighing, blending and wet mixing) are the dustiest, this portion of the process has been actually sealed off from the rest of the production area. And behind the segregating tile walls and air-tight doors walling in the fourth of the plant so occupied, a slightly lesser air pressure is maintained than is kept in the balance of the plant.

The effect of this is to keep air moving *inward* rather than outward from the materials handling and mixing area. Such dust as occurs, thus, is kept from straying to the electrode finishing processes. In other areas, positive pressure tends to keep dust from entering the building.

More Air—Another air cleaning process is employed to vacuum up dust at five critical points: At the weighing scale where materials are dumped into the hopper; at the point where dust-impregnated used bags are stored; at the point where the dry mix is screened; at the blending machine; and at the beginning of the wet mix process.

Later on, when it is necessary to brush dry particles from the electrode coatings, two wet-type collectors absorb the residue thus accumulated.

Filtering Out—Such air as is filtered when it is exhausted from the building passes through two wet-type dust collectors. The unusable dust material (as opposed to larger and salvageable particles of the coating) as well as that collected by the other processes previously mentioned, all moves through closed channels to an underground sludge or settling tank outside the plant.

This 13 x 4 x 6-foot tank also receives the residue from the wet mix operation, all kettles having to be thoroughly flushed to receive fresh batches.

Another phase of the good housekeeping program is underground storage of the silicates used in the manufacture of electrodes. Kept at a constant 55 F by means of water piped from natural springs, these silicates are piped directly to the processing areas, eliminating the possibility of spilling this sticky fluid in work areas.

Oven—The modern-design baking oven, built by Ovens for Industry Inc., Cleveland, is 150 feet long and permits 450 feet of continuous travel by the electrodes during the baking process. Doors at floor level permit inspection at every step.

Oven is so balanced that air spillage is prevented. Products of combustion generated are not allowed to pour out of the end of the equipment, carrying dirt and steam into the building. A calculated exhaust operated by fans absorbs the approximately 15 per cent expansion of air volume generated in the baking process.

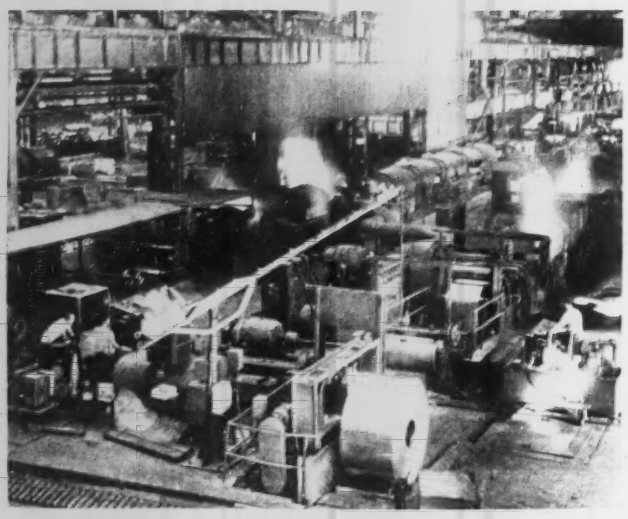
As it emerges from the oven, the baked rod is given visual inspection. Even though defects may not be observed, a statistically calculated number of electrodes is automatically selected from each mix, and each electrode in the sample is examined against a classified list of possible defects.

Huge lazy susan serves the dry mixing and weighing station. Impurities lurking in air at this point are costly

To reduce stirring of dust from bags of dry materials, raw materials are handled by pallet load and lift truck

Fixtures in rest rooms are wall mounted so that entire floor can be vacuumed or washed with minimum effort

Oven is so balanced that spillage of air is prevented. Doors at floor level permit inspection at each step



Steel going into looping pit after cleaning operation

Selection of METAL CLEANING CYCLES

By DR. SAMUEL SPRING
Research and Development Division
Pennsylvania Salt Mfg. Co.
Philadelphia

Water enters into picture in terms of hardness and rinsability. It is but one of many variables that must be weighed in the choice of the right cleaner for the job

WATER is important in selection of cleaning cycles on two counts: Influence of dissolved salts that create water hardness and, from the standpoint of rinsing, the removal of cleaner residues from the metal surface.

To counteract water hardness, it is customary to use polyphosphates incorporated into cleaners. Object is to maintain calcium and magnesium ions in solution as complex ions which are soluble in water. Additional function is to have some polyphosphate carry over into the rinse waters to maintain the ions in solution or solid materials in suspension.

Of course, in hard water areas, it is sometimes economical for the electroplating plant to put in water de-ionizing systems.

Adequate Rinsing—It is difficult to overestimate the desirability of this point. Rinse tanks should have surface skimming troughs, so contaminants that float on the surface are not picked up by the work as it comes out of the rinse tank. Adequate overflow also should be provided. Word adequate is frequently misused since some feel that a 1-inch water pipe running into a 3000-gallon tank fills the bill.

Positioning intake and outlet of the water flowing into a rinse tank is important. They should not be too close to each other and preferably at opposite ends of the tank.

This will insure circulation of water and removal of contaminants. Hot water rinse tanks also need substantial overflow. Fresh water reduces concentration of contaminating ions.

While, of course, it is expensive to throw away hot water, the cost must be balanced against the effectiveness of the process. This may be a poor place to economize.

Cleaner—Type of cleaner used for a particular condition is dependent upon many variables. There are different cleaners for steel, brass, aluminum, zinc, etc. Some are superior for mineral or fatty acids, sulphurized oils, semi-solid oil or removal of light rust or scale in addition to other soils. And different cleaners are supplied for soak tank operations, spray operations and electrolytic cleaning.

Standards of performance will determine use of cheap or expensive cleaner and level of agitation. For highest standards and/or heavily soiled objects, double or triple cleaning may be used. Type of water also may dictate the nature of the cleaner.

Ingredients—One way to attack the subject is to discuss the compounding of a cleaner. For alkaline cleaners, of course, alkaline salt represents the basic ingredient. It may be a single salt or it may be (and frequently is) a combination of several. Of the alkaline salts, silicates and the phosphates are the best materials as far as detergency is concerned—former is more effective in removal of fatty acids than the latter.

Caustic soda is often a component but it is rather ineffective in itself. Used to neutralize acidic soils, it is an important com-

This is the last of two articles on the subject by Dr. Spring. First, which was published in STEEL, Nov. 9, p. 112, dealt with other factors involved in the selection of a cleaner.

ponent of electrocleaner because of its high conductivity. Soda ash and borax, frequently used as extenders for cleaners, are relatively ineffective, but there are some cases where they are more justified by specific conditions, such as type of metal or nature of the cleaning solution.

Surfactants—These organic, surface-active agents represent soaps derived from fatty materials and rosin acids, as well as synthetic, soap-like materials, which are becoming more popular.

Surfactants foam a great deal and are the workhorses of the soak cleaners but the despair of the spray cleaners. In electrolytic cleaners, they may be desirable or undesirable, depending upon how they are used. Reasonable amount is highly desirable to provide a light foam blanket to avoid excessive spray as the gas breaks through the surface of the cleaner. Excessive foaming, however, could be detrimental; that is, if the foam is of a stable nature and builds up to the point where it overflows.

Fatty Acid Soaps—Saturated, fatty-acid soaps are not too soluble in water and rinsability presents a problem, especially in hard-water areas. Soap combines with soap to form insoluble lime soaps that form a scum on the surface of the tanks. In general, there is a tendency to avoid this type in most alkaline cleaners.

For soak-type cleaners, it is highly desirable to have as much surfactant as cost allows.

Other components of cleaners are polyphosphates, added to provide some protection against hard water and to improve rinsing characteristics of the cleaner. Sodium hexametaphosphate, tetrasodium pyrophosphate and sodium tripolyphosphate are quite effective.

Typical Situation—Buffing compound soil is rather common in electroplating. Generic term covers material with wide variations in composition, but, usually, buffing compounds consist of greasy or waxy bases; with a finely divided filler or polished material. Tripoli or extremely-fine, natural silica are most frequently used.

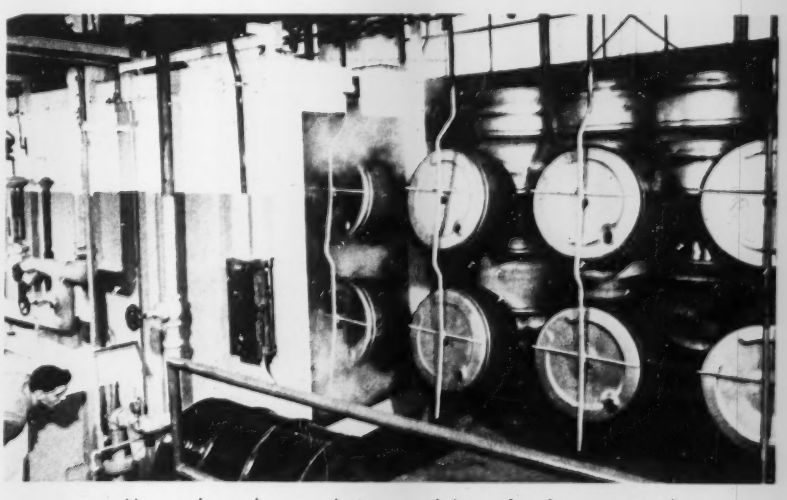
High melting base, fineness of filler, high temperature of application, frequent embedment in the metal surface and necessity for extremely careful removal of all traces of soil prior to electroplating combine to make removal of this soil one of the most critical of all cleaning operations. Much depends upon the skill of the buffer in not leaving too much compound or "burning-on" compound.

Continued on next page

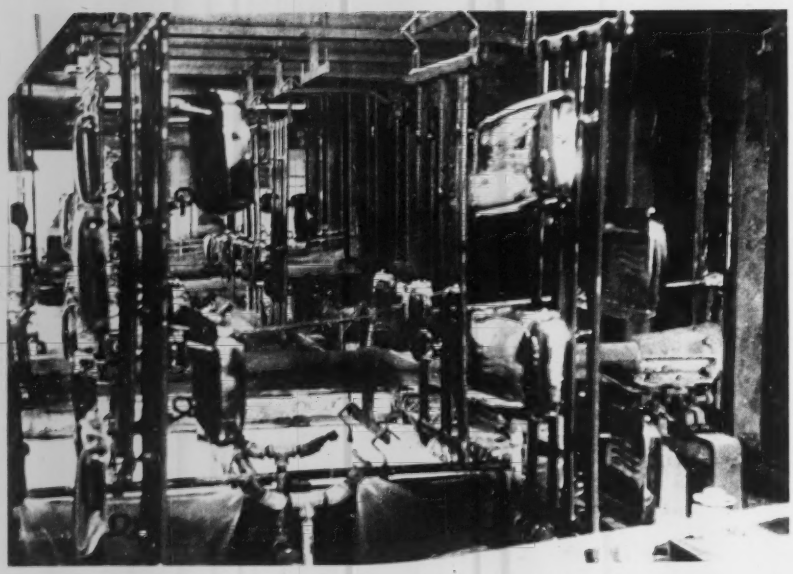
COMMON SOILS AND METHODS OF REMOVAL

Soil	Suggested Cleaning Method
Mineral Oil	
High viscosity	Emulsion cleaner or vapor degreaser
Fatty Oil*	Alkaline cleaner
Sulphurized oils*	
Mineral	Alkaline cleaner, emulsion cleaner, or vapor degreaser
Fatty	
Grease drippings from machinery	Alkaline cleaner
Buffing Compound*	
Waxy	Emulsifiable solvent or vapor degreaser followed by alkaline soak and electrocleaner
Water-soluble	Alkaline soak and electrocleaner
Emulsion Drawing compound*	Alkaline cleaner
Sulphurized*	Alkaline cleaner
Pigmented*	Spray alkaline cleaner or electrocleaner
Oil base drawing compound*	Emulsifiable solvent or vapor degreaser
Pigmented	Spray application of above
Rust-preventive	
Light, polar*	Special alkaline cleaner or emulsion cleaner
Heavy, polar*	Emulsion cleaner plus alkaline cleaner or solvent
Heavy, non-polar	Emulsion cleaner, solvent or vapor degreaser
Asphalt base	Solvents, vapor degreaser, or emulsion cleaner plus alkaline cleaner
Pickling Smut	Electrocleaner
Carbonized Oils	Emulsifiable solvent and alkaline spray or electrocleaner
Waxes	Emulsion cleaner plus alkaline cleaner or vapor degreaser
Soap and modified soap	Hot water or alkaline cleaner

*Aging is an extremely important factor for these soils.



Heavy-duty cleaners being used here for ferrous metals

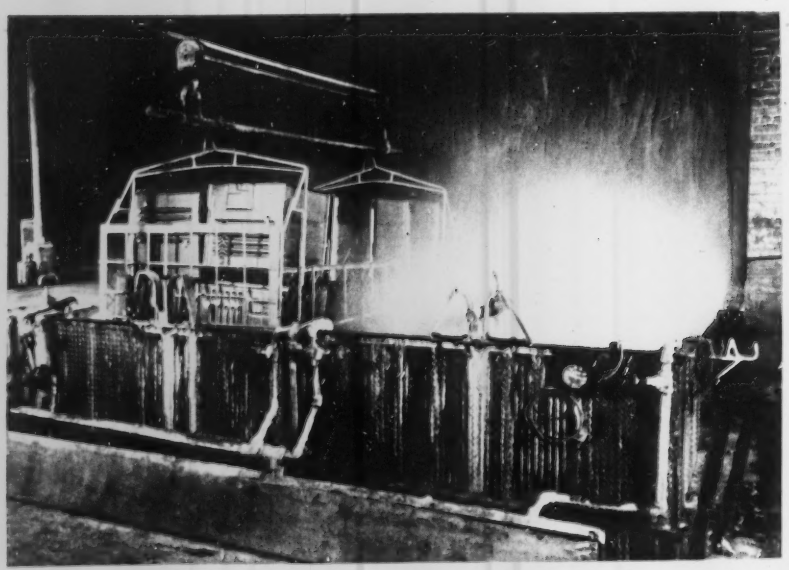


Nickel-plated parts being cleaned prior to chrome plate

Typical Cycle—First step could involve: 1. Precleaner consisting of a solvent used by wiping or of a vapor degreasing operation. 2. Or application of an emulsion cleaner or an emulsifiable solvent to remove bulk of soil. Precleaner usually leaves surface with oily residue that sheds water, even though amount of oil remaining is small.

Precleaning cycle is followed by a soak cleaner, usually containing substantial quantities of surfactant, which removes oily residues. After a rinse, work is electrocleaned to remove last traces of oily soils and solid particles or smut that require a high level of agitation.

After a rinsing operation, it is highly desirable to provide a short acid treatment to remove oxide and condition the surface to improve adherence of electroplate. In many mass production lines, each step may be repeated to obtain better plating surfaces.



Work goes into alkaline bath before porcelain enameling

Hydraulic Lathe Controls

Hydraulic controls feature the performance of large commercially produced lathe for turning steel mill rolls built by Lewis Machinery Division, Blaw-Knox Co., Groveton, Pa. Hydraulic smoothness in over-all performance is carried over into the drive for the giant 60-inch lathe, first of which went into U.S. Steel Corp.'s Fairless Works.

Drive, although mechanical, has a smoothness said to be the equal of a hydraulic system. Smooth operation is achieved by use of double-enveloping worm gear set manufactured by Cone-Drive Gears, division of Michigan Tool Co., Detroit, as the primary reduction between the headstock and the 60-hp drive motor.

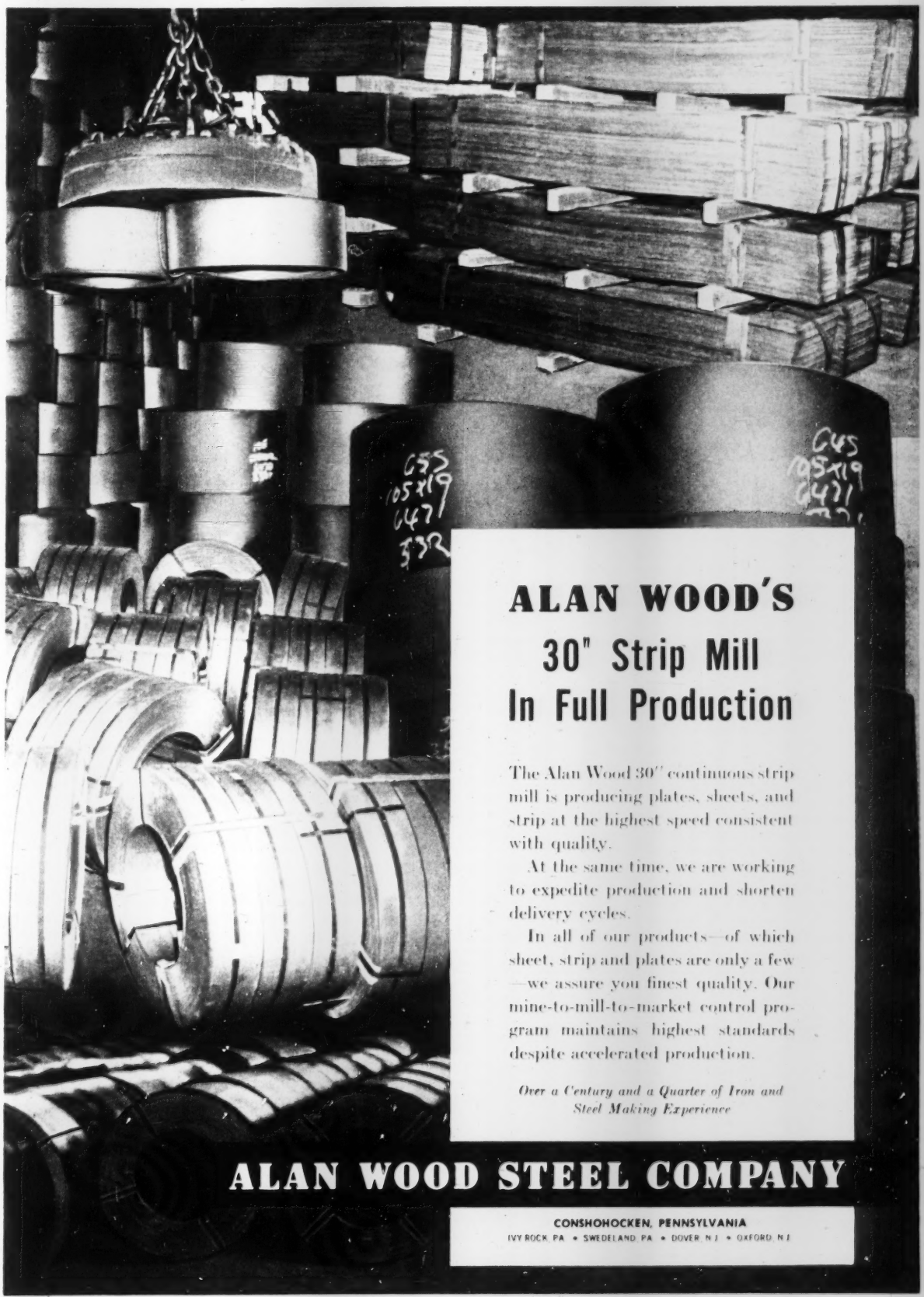
More Teeth in Contact—Unique design of the gearset, having a 20.1885-inch center distance and a 60:1 reduction, enables more teeth to be in contact simultaneously and with greater contact per tooth than is possible with conventional gearing.

Larger center distance, about 30 inches, would be required to handle load if conventional worm gears were used. Decrease in center distance permits compact design of lathe. This drive and hydraulic controls combine to make possible time savings of as much as 75 per cent in producing steel mill rolls requiring extensive machining.

Alloy Reduces Weight, Size

Thomas & Skinner Steel Products Co. Inc., Indianapolis, manufacturers of permanent magnets, electrical laminations and wound cores, has developed an Alnico alloy, offering an energy product of 5.70 x 10^6 Bd Hd. Designated Alnico 5Cb, this alloy is said to offer the highest energy product of any Alnico.

It is similar in physical characteristics to Alnico 5, but offers considerably higher external energy and residual reduction. This product is designed for electrical, electronic and industrial applications and opens more possibilities for weight and space reductions in product design.



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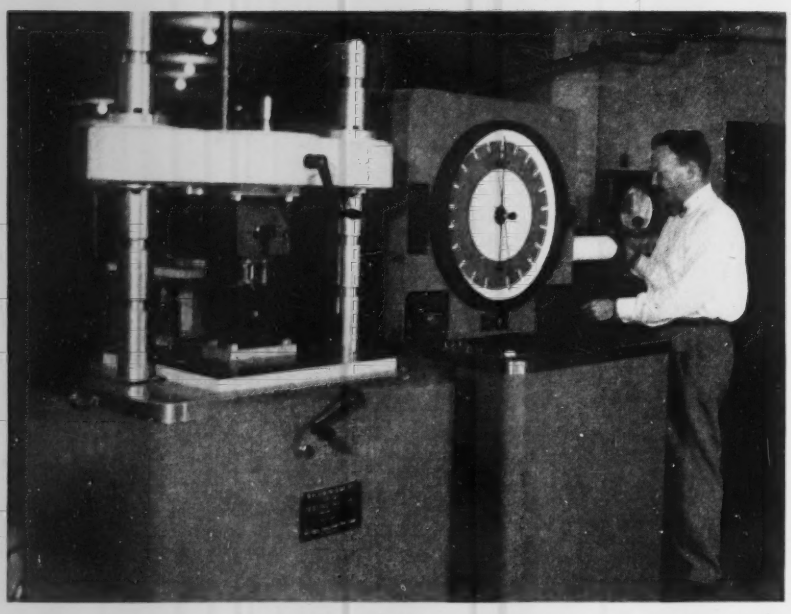


Machine can apply loads steplessly between 0.025 and 9 inches per minute. Load is applied in either direction through a single reversing power screw

Tester Is All-Round Performer

Using resistance wire strain gages for load measurement, new machine can apply seven different tests to specimens and components. Capacity is 50,000 pounds

NEW UNIVERSAL testing machine can check specimens in tension, compression, flexure, creep, stress relaxation, torsion and shock. Machine is the recently improved model FGT Baldwin-Emery SR-4, made by Baldwin-Lima-Hamilton Corp., Philadelphia.

New model, a machine of 50,000 pounds capacity in tension and compression, uses SR-4 resistance wire strain gages for load measurement. Loads are measured by two SR-4 load cells at the base of two vertical tie rods.

Better Load Reversal—With new load-cycling system, it is possible to adjust control points by two load-indicating dial knobs, at the left of the main 24-inch diameter load-indicating dial, to any two loads between 50,000 pounds compression and 50,000 pounds tension. Cycling thus may be kept within the tension range, within the compression range, or between any tensional load and any compressional load.

Rate of cycling depends upon strain amptitude within the machine's speed limits. These normally are 9 inches per minute up to 10,000-pound load, 4 ipm up to 30,000-pound load, and 2 ipm up to 50,000-pound load. Loads are applied to the bottom platen by a single reversing power screw from a variable speed electric motor. Maximum power stroke is 8 inches.

Eight Ranges—Indicator dial on the new model has its zero at the top with 500 divisions plus and 500 divisions minus for indicating compression loads (counter clockwise) and tension loads (clockwise). Four ranges are provided: 0-50,000 pounds, 0-10,000 pounds, 0-2500 and 0-1000 pounds. Four additional ranges are available with an SR-4 Universal Load Cell of 500 pounds capacity which can be mounted on the crosshead and connected into the main dial indicator. These are 0-500 pounds, 0-100 pounds, 0-25 pounds, and 0-10 pounds. In the 10-pound range one scale division represents 0.02 pound.

A strain-cycling system is also provided. It is controlled by plus and minus separation of the gage points of an SR-4 extensometer operating through an SR-4 type stress-strain recorder, which is standard equipment. For head-travel cycling, distinct from either load or strain cycling, the machine has upper and lower head-motion reversal stations.

Varied Constants—Head motion speed can be held constant at any setting of the speed control knob, calibrated in inches per minute of platen movement between 0.025 and 9 ipm. Constant rates of load application and strain are provided by pacing discs. Load pacing is adjustable from dial capacity per minute on any range down to 1/20th dial capacity per minute in either direction. Strain pacing is adjustable from 0.00025 to 0.25 inch per inch per minute in either direction.

Load, strain, and platen position can also be held constant by setting cycling controls at zero.

Safety Features—A new overload clutch protects the drive motor against exceeding torque rating. Electrical devices protect the weighing system, and limit switches prevent overtravel.

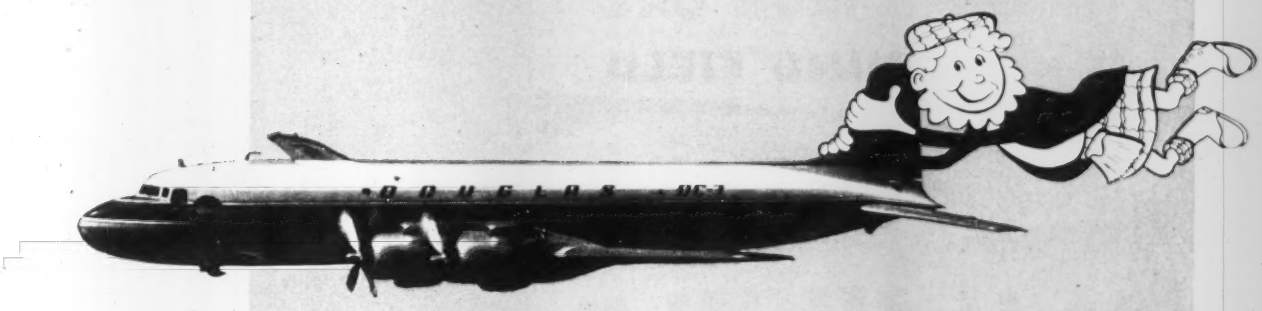
All testing can be done within a single opening of convenient height since load can be applied in two directions. When loaded to maximum capacity one inch from its vertical axis in any direction, accuracy of load indications is unchanged.

Horizontal clear space between columns is 21 inches and the standard maximum vertical opening between platen and crosshead is 24 inches. Working space on the testing machine table is 20 x 20 inches.

External or load indicator bypass circuits may also be used to feed bridge outputs to printers, extension - under - load indicators, offset yield strength indicators, and analog-to-digital converters which in turn record load and deformation data on automatic typewriters and card-punchers.

The fastest piston-powered

COMMERCIAL AIRLINER *in the world....*



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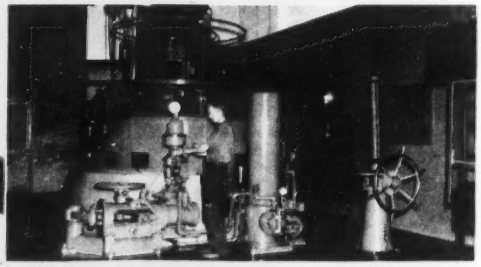
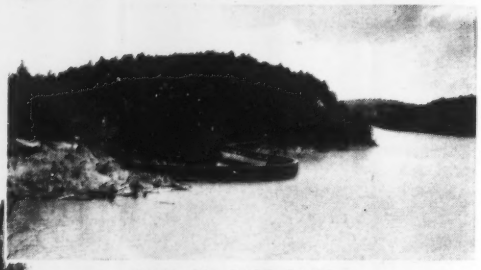
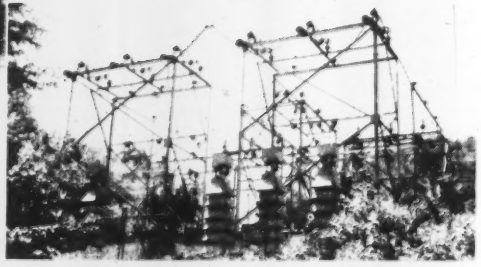


INTERIOR OF DEAD RIVER HOIST PLANT



DAM ON CARP RIVER



ONE OF NUMEROUS SUB-STATIONS OF THE C. P. & L. CO.

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CCC

In 1910, The Cleveland-Cliffs Iron Company built their first hydro-electric plant on the Au Train River in Michigan. In rapid succession followed the plants on the Carp River, and two more on the Dead River. This rather extensive hydro-electric system was inaugurated chiefly to supply the power necessary for ore operations on the Marquette Range. Today, these operations are a part of The Cliffs Power & Light Company, which also produce power through other sources.

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THE Cleveland-Cliffs IRON COMPANY

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

Steel Group	AISI and SAE Steel Sub-Group	Sub-Group Color	
	Low-Carbon (.25 and less)	Light Blue	
Carbon Steels	Medium-Carbon (.26 to .52)	White	
	High-Carbon (over .52)	Black	
	Free-Cutting (11xx and 12xx)	Yellow	
		Basic Color	**Optional Supplementary**
	Miscellaneous	Bronze	
	Manganese (13xx)	Brown	**Colors for Alloys Listed**
	Nickel (2xxx)	Pink	
	Nickel Chromium (3xxx)	Grey	
Alloy Steels	Molybdenum (4xxx)	Dark Blue	Low carbon—Lt. Blue
	Chromium (5xxx)	Red	
	Chrome Vanadium (6xxx)	Orange	Medium carbon—White
	Silicon Manganese (92xx)	Green	
	Triple Alloy (86xx, 87xx, 93xx, 94xx, 97xx, 98xx)	Aluminum	High carbon—Black
	Boron (xxBxx)	Purple	
		Basic Color	**Supplementary Color**
	Carbon	Yellow	Black
	Non-Deforming	Yellow	Dark Blue
Tool Steels	Shock-Resisting	Yellow	Aluminum
	Hot Work	Yellow	Bronze
	High Speed	Yellow	Lt. Blue
	Miscellaneous	Yellow	White
Stainless and Heat Resisting Steels	Austenitic (3xx)	Purple	Brown
	Martensitic (4xx)	Purple	Aluminum
	Ferritic (4xx)	Purple	Bronze
	Martensitic (5xx)	Purple	Dark Blue

Canadian Plan for Birthmarking Steels

Cold finished shapes identified by ink stamping, hot-rolled by indentation stamping. Both are supplemented by standard color code prepared for 24 sub-groups

CODE for the identification of steels has been published by the Canadian Government Specifications Board. Covering hot rolled and cold finished shapes, it applies to governmental departments and agencies that wish to identify materials to be held in stock. Code is not intended to include steels to be used immediately after delivery.

Two methods of identification are set out: Ink or indentation stamping, which is supplemented by a color code. Ink stamp is to be used on cold finished stock, while indentation stamp is for hot rolled stock.

For discussion of proposed alloy identification system in U.S., see STEEL, July 20, p. 46.

Specifications—Ink or indentation stamping shall be done in a repetitive manner, with identification marks not less than three feet apart. Code applies to any grade and any formula of steel. Although it normally pertains to shapes other than angles, channels and sheets, they, too, may be identified if desired. Frequency of ink stamping sheets (generally not identified by indentation stamping) shall be specified by user.

Lower limits: Round bars as small as $\frac{3}{8}$ inch in diameter or other bars or shapes offering a surface capable of receiving an ink imprint not less than $\frac{1}{4}$ inch in height or an indentation stamp not less than $\frac{1}{8}$ inch in height.

Ink Stamping—Regulations call for automatic re-inking setup and uniform colors bright red ink for bright finish steel and yellow for all other finishes. Ink must be indelible, quick drying and have good adhesion.

Indentation Stamping — Set of steel dies must be capable of placing identification on stock any time after manufacture. Automatic equipment is specified, unless small quantities warrant hand stamping.

Stamping Data — Requirements will result in a marking that will look like this: SMITH-CAN-1020-N-B-6-8-52. "Smith" refers to a trade mark symbol (some other word or abbreviation can be used) to identify manufacturer. "Can" refers to country of origin (this is optional). Number that follows (1020) refers to SAE code (letter also could be used). Letter "N" signifies condition (normalized). Other possible markings here are: SA, spherodized; A, annealed; and HT, heat treated. Letter "B" identifies batch (number could be used). Final three numbers state month, day and year.

Color Code — Visual identifica-

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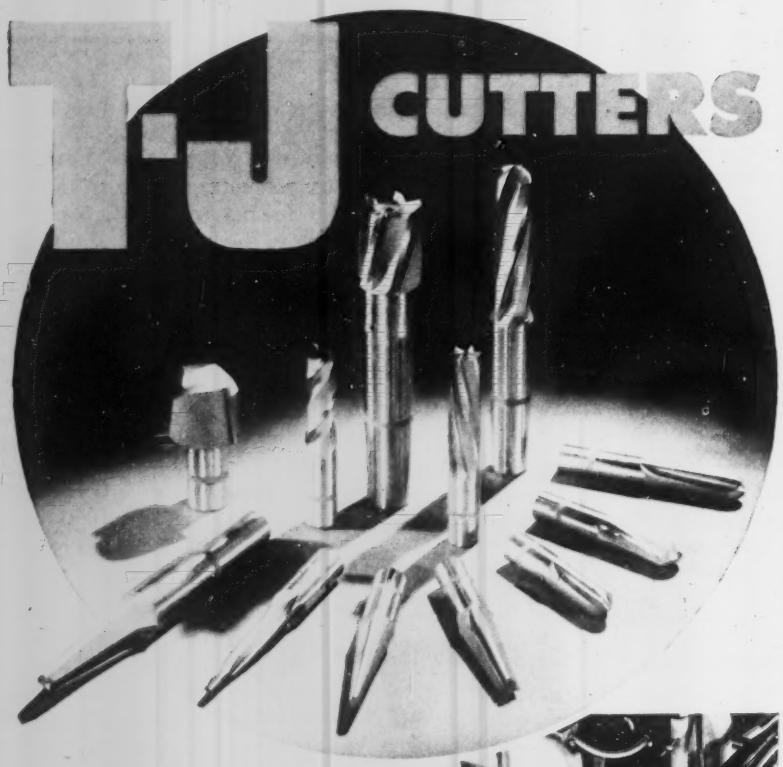

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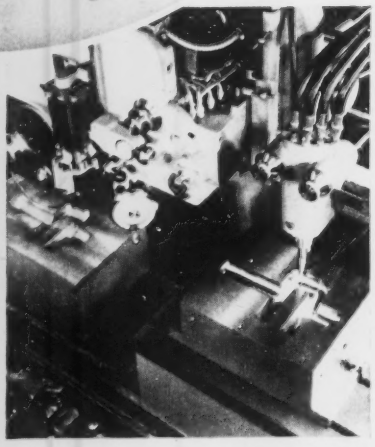


T-J Cutter at work on a Cincinnati 16" Vertical Hydrotel, latest design Die Sinker. A cutter of the right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these new machines.

FOR TOUGH JOBS SPECIFY

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

T-J

tion is object here. Code establishes, defines and assigns a color or color combination to each of 24 sub-groups of steels, which fall under four main headings: Carbon steels, alloy steels, tool steels and stainless and heat-resisting steels. Manganese steel in the 13xx group, for instance, has brown as basic color. Combination color would be brown and light blue for low carbon grades.

Application — Procurer specifies whether he or supplier applies stamps and color. Normally, color will be on both ends of stock. When two color combination is used, basic color occupies one-half of end area and the supplementary color the other half. In case of plate, colors will be applied at ends in bands about 2 inches wide.

For identification of small bars, shapes and sheets, where end application is not practical, color code may be applied in a continuous line along the length of the steel forms or it may be applied in rings or bands near the ends.

Chip Research Report

Publication of a research report on chip breaking consisting of a study of three-dimensional chip flow is announced by Jones & Lamson Machine Co., Springfield, Vt. James G. Hebert is chairman of the committee in charge of this research program for National Machine Tool Builders Association.

This research project is an attempt to determine, for cuts in various grades of steel, what dimensions control the form of the chip, to suggest the best angles of rake and clearance and to give the tool room a simple rule which will insure optimum results both as to form of chip and tool life.

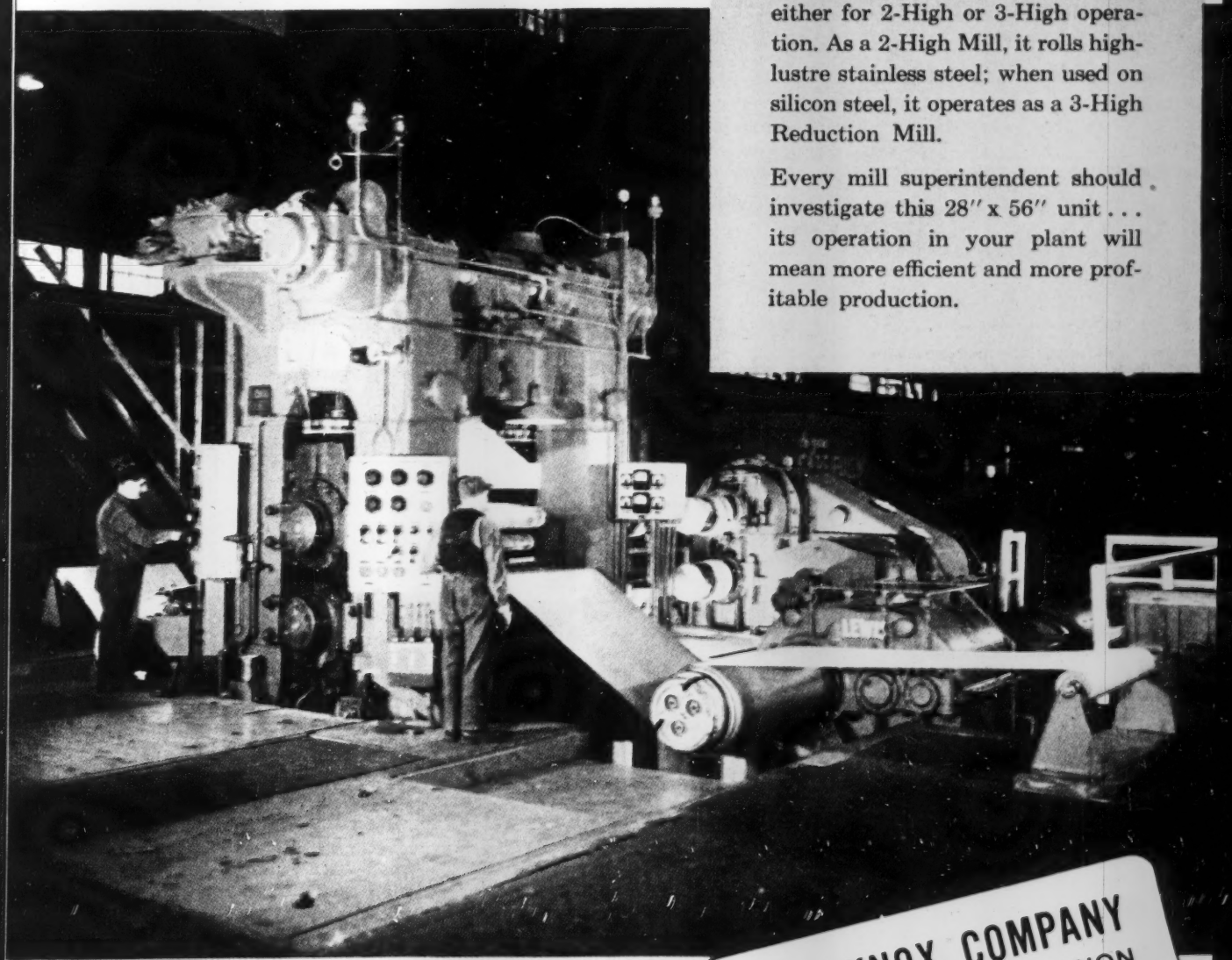
In addition to the report itself the steering committee has prepared a wall chart that can be hung in the tool room in order to give the men who grind carbide tools simple and clear directions on the optimum shape of the tool, including angles of rake and clearance and the dimensions of the chip-breaker.

Copies of the report and of the wall chart may be secured from the National Machine Tool Builders' Association.

Easily Converted from 2-High to 3-High NEW LEWIS MILL Rolls Stainless Steel and Silicon

Installed for one of the nation's largest special steel producers, this new LEWIS Mill can be set up either for 2-High or 3-High operation. As a 2-High Mill, it rolls high-lustre stainless steel; when used on silicon steel, it operates as a 3-High Reduction Mill.

Every mill superintendent should investigate this 28″ x 56″ unit . . . its operation in your plant will mean more efficient and more profitable production.



Photograph courtesy Allegheny Ludlum Steel Corporation

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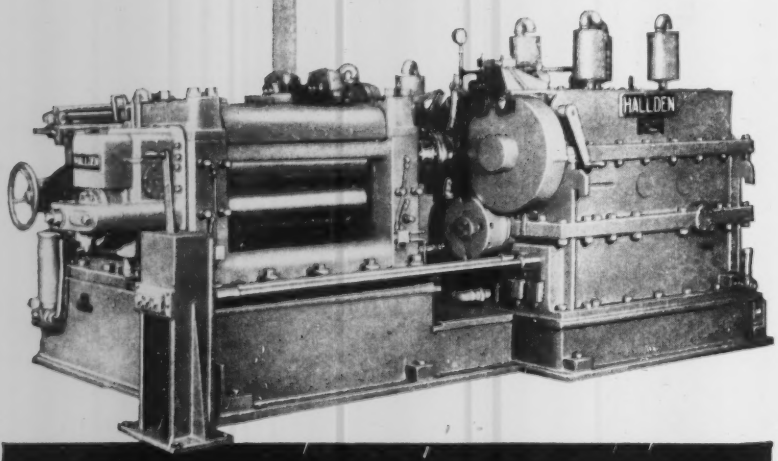


THE HALLDEN MACHINE COMPANY
THOMASTON, CONNECTICUT

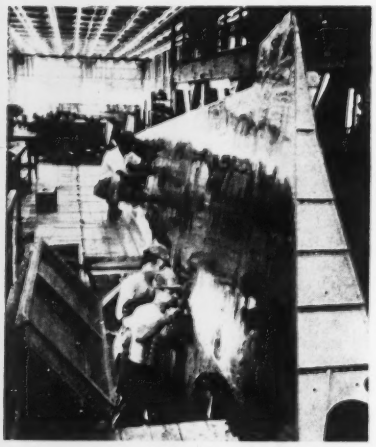
Sales Representatives
The Wean Engineering Co., Inc., Warren, O. T. E. Dodds, Pittsburgh, Pa.
W. H. A. Robertson & Co., Ltd., Bedford, England

Safety: 3 Million Manhours

FALLING OBJECTS aren't the only causes of head injuries in industrial accidents. Low-hanging beams, machinery supports, girders and other structural parts are headache traps which can send a workman to the hospital or plant first aid room.

The safety department at the Kansas City aircraft plant of Ford Motor Co. recognized such a serious head-injury potential in huge jigs used to fabricate wing assemblies for B-47 Stratojet bombers.

Look Out Below — Constructed of structural steel, the jigs are



INVITATION TO INJURY
. . . helmets are effective buffer

double-decked so both trailing and leading edges of the 67-foot long wing halves can be worked on at the same time. Wings are 22 feet wide at the inboard end. Sectionalized second-deck platform is supported by steel stanchions which themselves are bump hazards. Workmen on the first deck also are exposed to falling objects from the platform above.

To overcome this problem, Ford supplies all of its 1200 employees working on the jigs with safety helmets, similar to those worn by construction workers. These laminated plastic helmets are credited by the company with saving many hours of production time by preventing accidents.

Indoctrination — Everyone, including visitors, is required to wear a safety helmet when he goes on one of the jigs. Even the riggers and cranemen who move sub-

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact . . . that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it . . . annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

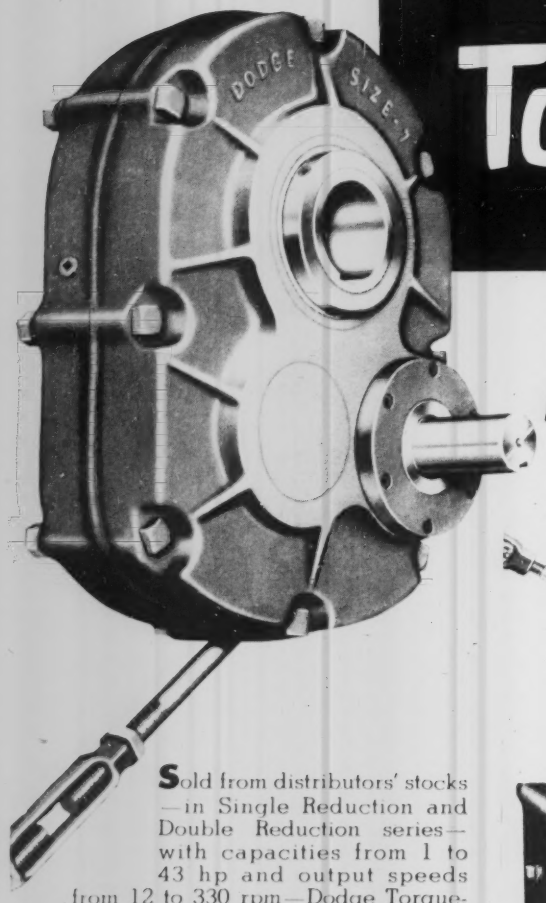
California giant Sequoias—largest of all trees.

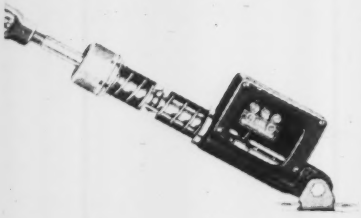
BRANCHES: ATLANTA, 615 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 4525 W. ROOSEVELT RD. • CINCINNATI, 3253 ERIE AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 EIGHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

PHOTO BY MC MANUS

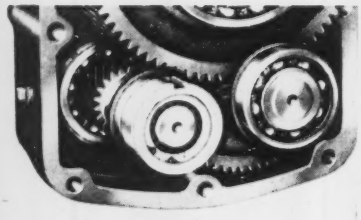
Torque-Arm

The Most Complete Line of Shaft-Mounted Speed Reducers!





TRI-MATIC OVERLOAD RELEASE
Provides instant, positive protection for driven machines, motors and reducer itself. Automatically (1) loosens the belts, (2) cuts off power, (3) gives a warning.



TORQUE-ARM BACK STOP
Available from stock when required. Easily installed—sealed inside reducer housing. Simple, positive action prevents reversal.

Sold from distributors' stocks—in Single Reduction and Double Reduction series—with capacities from 1 to 43 hp and output speeds from 12 to 330 rpm—Dodge Torque-Arm is the new and modern idea in speed reducers.

No special engineering required. No foundation to provide. No flexible couplings. No sliding base. No lining up difficulties. No expensive installation. Stock Taper-Lock sheaves prescribed for each job to provide desired speeds. Application to other machines is practical and easy.

Unit is driven through any V-Belt Drive. Torque-Arm, fastened to any fixed object, anchors the reducer unit. Turnbuckle provides fast and accurate adjustment of belt tension.

Standardize on Torque-Arm, the speed reducer that saves you money.

DODGE MANUFACTURING CORPORATION
4400 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book.

1878 DODGE 1953 75th ANNIVERSARY

TAPER-LOCK SHEAVES, SEALED-LIFE V-BELTS

DODGE-TIMKEN PILLOW BLOCKS

TAPER-LOCK FLEXIBLE COUPLINGS

NAME PLATES FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 N. SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS

assemblies and material to the 14 jigs must wear the Mine Safety Appliance Skullgards. Cap-type hats are used because the men frequently work in confined spaces where a full-brimmed hat would be cumbersome.

The importance of wearing protective hats is stressed in safety-indoctrination classes given all new employees. Large signs stating that everyone must wear a safety hat are posted on all jigs in the plant.

Use of safety hats on big jigs is just one phase of the over-all safety program at Ford's Kansas City Aircraft Plant . . . a program that has resulted in completion of more than 3 million manhours of work without a lost-time accident reported.

Heavyweight Welding

ARC WELDING heavy steel mill machinery provides a high degree of design flexibility where modifications must be made to suit special installations. Furthermore, resultant assembly is tight and not subject to misalignment from effects of vibration. However, sound weldments can be assured only through extensive experience in the work and careful training of welders.

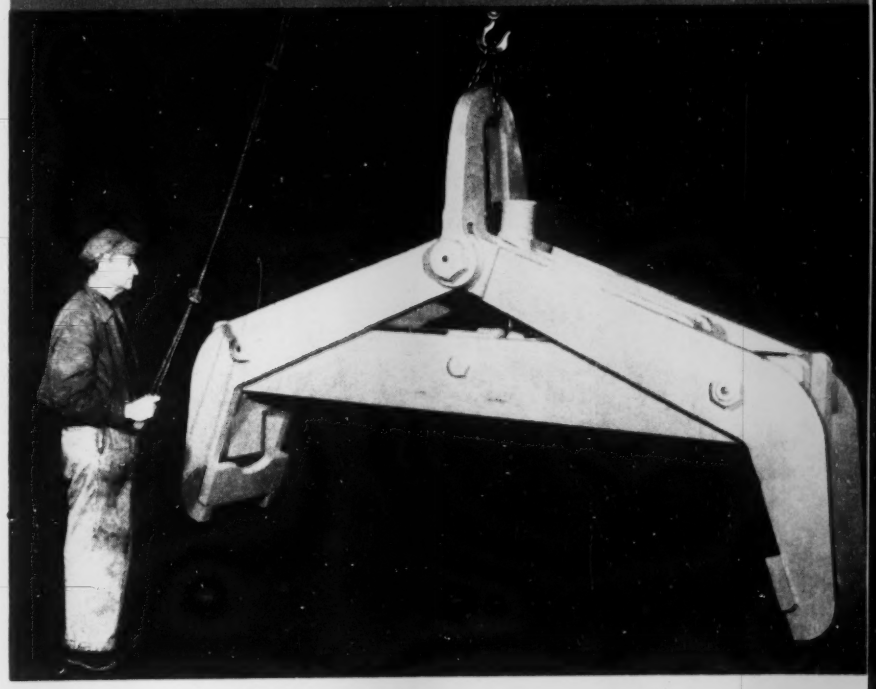
Illustrating the capacity of the technique is one of the heaviest weldments handled anywhere on a regular production basis — an 80,000-pound frame for a No. 15 billet shear built by Buffalo Forge Co., Buffalo. The company builds these shears in a full range of sizes and all are 100 per cent arc welded.

Shear illustrated, a combination of rolled steel plate and steel castings, will cut up to 7-inch square 0.20 per cent carbon hot steel billets, as well as 3 x 22-inch slabs or 7¾-inch round bars.

Manual Arc—Massive side plates which carry most of the load in operation are of 3-inch-high tensile silicon-killed armor plate steel. Front and rear spacer plates, along with inside spacers, are of similar material. Initial fabricating operations such as cutting the circular opening for the drive mechanism, drilling and welding the heavy cast steel guide frames, are done in the flat position with

American Cranehand

automatic mechanical handling devices



Automation can help pep up production safely and at a speed that cuts costs

Overhead handling devices are hauling an increased burden in modern industrial plants — and in applications that were unheard of ten years ago. The American Cranehand lifts burdens as fragile as a sugar sack or as bulky as a 160-ton forging blank.

The versatile Cranehand handles ingots, ingot molds, pipes, sheets, submerged castings, barrels, coils, plus many other materials — and moves them through areas too small for a lift truck. And the American Cranehand is completely automatic — it grabs, lifts, transports and deposits the burden without the aid of a ground crew or extra electrical equipment.

Automation of materials in your plant can be speeded — and with added safety — with the automatic, mechanical American Cranehand. Perhaps the design best suited to your needs is on the drawing board at American Forge right now; the information and suggestions of our engineering experts are yours for the asking.

Write today for free information on the automatic American Cranehand!

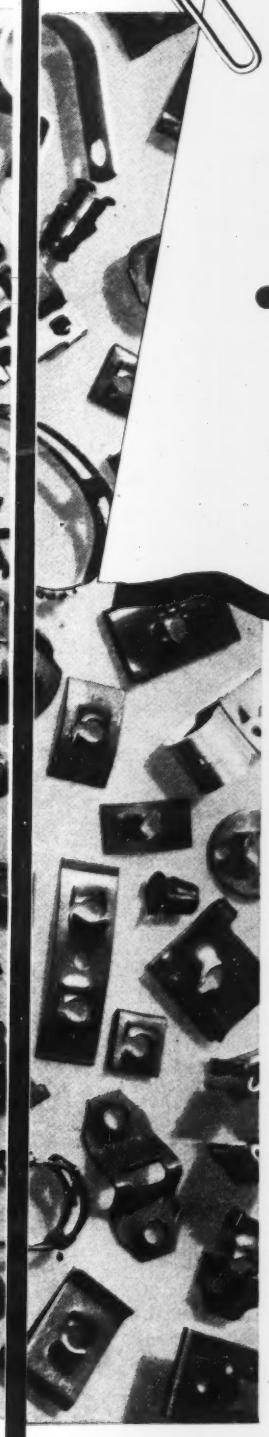
American Forge and Manufacturing Co.

820 Shore Avenue · Pittsburgh 12, Pa.

"Forgings for Industry since 1890"

how Tinnerman Products solved

a tough heat-treating problem:



with Gulf Super-Quench

- minimum hardness was increased from 50 to 60 RC
- variation in hardness was reduced from ±5 to ±2 RC

on AISI C-1064 STEEL

Tinnerman Products, Inc., Cleveland, Ohio, manufactures a large variety of spring clips and spring fasteners of the type pictured at the left. These parts range in thickness from .01 to .062 inches and are all made of AISI C-1064 spring steel.

Normal heat treating practice calls for heating to 1600 deg. F. in a controlled atmosphere. The parts are held at this temperature for approximately ½ minute, then are transferred by a shaker-type conveyor into the quenching bath, which is held at 120 to 125 deg. F. After quenching, the parts are tempered at 700 deg. F.

When Tinnerman used a conventional quenching oil, hardness varied from 50 to 60 RC—too low and too variable for suitable performance characteristics. Examination of the steel revealed that in all cases it was within specification limits.

After investigating a number of other quenching oils, Tinnerman Products discovered one that is outstanding—Gulf Super-Quench. Tinnerman Products is now quenching all of these parts in Super-Quench with remarkable results. Hardness is never lower than 60 RC and averages 62 ± 2. This improvement was obtained without any change in quenching temperature, degree of agitation, analysis, or grain size.

If you, too, are looking for ways and means to increase the efficiency of your quenching operation, it will pay you to investigate the advantages of Gulf Super-Quench. Write, wire, or phone your nearest Gulf office.

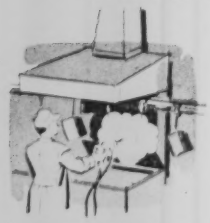
Gulf Oil Corporation · Gulf Refining Company

Pittsburgh 30, Pennsylvania

GULF SERVES INDUSTRY

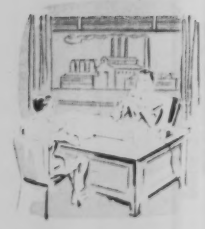
WANT TO LOWER YOUR PAINTING COSTS?

. . . and get a better paint job, too? Check the RANSBURG Processes!



Let's say you're a manufacturer of some painted product. Size and shape aren't too important. You're already using a conveyorized set-up, but you want a better quality finish . . . increased production . . . at less cost.

You've heard about electrostatic spray and some of the phenomenal results being achieved by Ransburg on other production lines. You write or call . . . say you want to know what Electro-Spray painting can do for YOU.



Ransburg engineers will help you investigate the possibilities. They'll gather complete data on your present operation, and check your facilities and requirements. If Electro-Spray is feasible, you will send samples of your unpainted products—with paint—to the Ransburg laboratories in Indianapolis. The labs are completely equipped, and the Ransburg engineers and technicians have every facility at their disposal for conducting extensive tests, simulating your production conditions.

After the priliminary studies and tests, you are invited to see your job run in the Ransburg Labs. There's no guesswork. You'll see the actual results. Paint and labor savings are determined. You can check the improved, uniform quality, and you'll be furnished drawings, showing the proposed installation for your own plant.

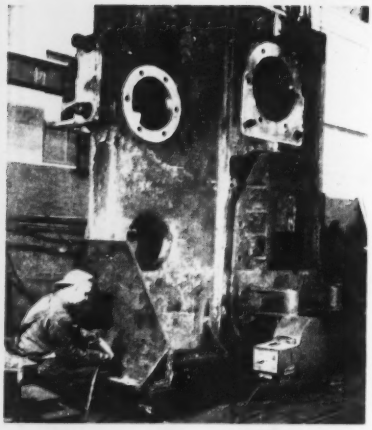
ALL OF THIS WITHOUT OBLIGATION TO YOU!

After the Electro-Spray equipment is installed, Ransburg will continue to work with your finishing department. Ransburg engineers—men skilled in electrostatic spray painting—are always available to work with you on any problem which might arise in your finishing department. Fair enough? Let us hear from you.

RANSBURG

Ransburg **ELECTRO-COATING CORP.**

INDIANAPOLIS 7, INDIANA



SQUIRT TECHNIQUE
. . . flexibility on heavy machinery

the plate adjusted level on a steel platen slightly above floor level. A number of large plug welds are required to be made at this stage.

About half the arc welding involved is manual type using direct current machines and E-6010 and E-6020 electrodes. As far as possible it is carried out in downhand position. As assembly progresses and is raised to the vertical position, other members are added, such as the rear support plates and base of 1½-inch material. In the illustration, the operator is fillet welding these elements by the Lincoln manual semi-automatic "Squirt" welding technique.

Freedom from Distortion—This is a hidden arc method employing 5/64 inch copper-coated L-60 steel electrode wire in combination with a No. 760 mild steel agglomerated flux. A No. 8 current setting is used on the generator shown at lower right. Relatively high welding speed is possible with the flux covered arc, and good penetration and freedom from distortion are realized.

Safety Package for Industry

In line with the growing demand for greater plant safety, E. F. Houghton & Co., Philadelphia, has completed a study to determine what products in its standard line will help reduce the present fire hazards in industry.

An 8-page safety folder describing each of these processing products is now available from the company, 303 W. Lehigh Ave., Philadelphia 33.

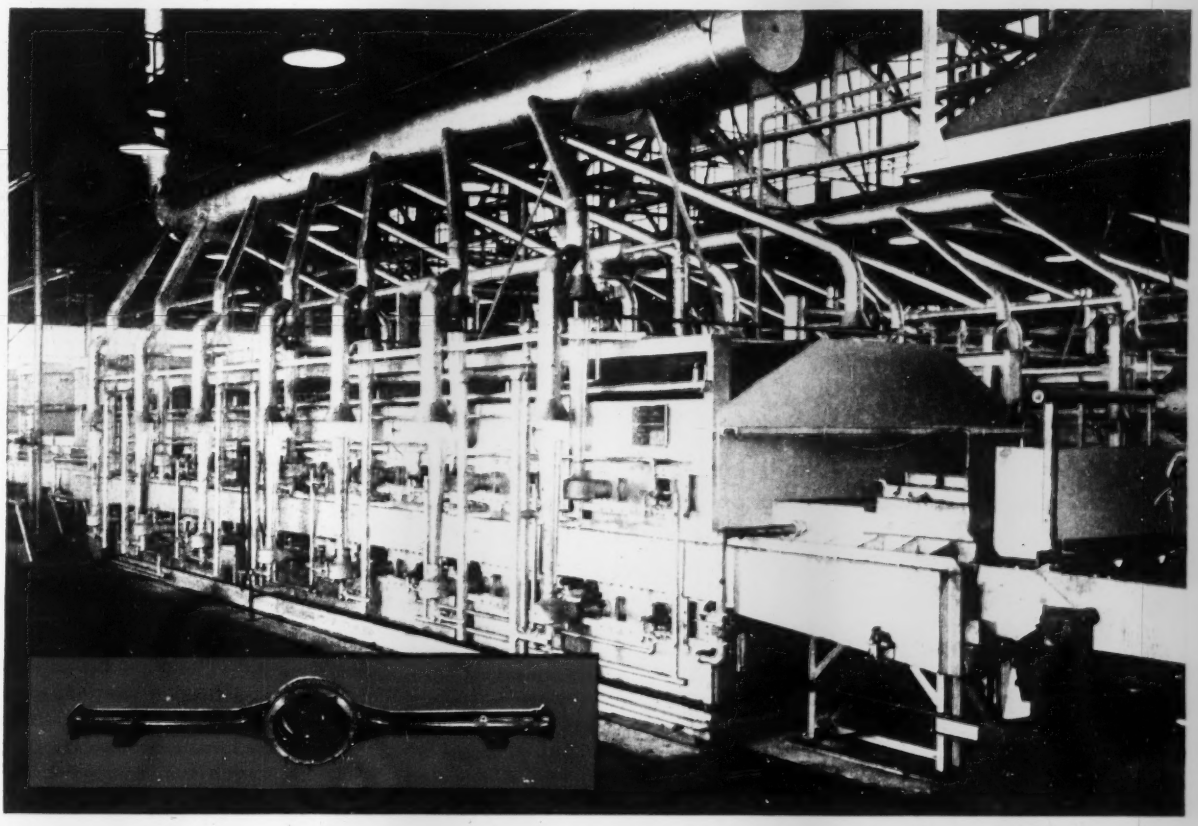
at five tons per hour

Ford Motor Company makes rear axle housings from welded steel tubing. Deformation in forming operations is so severe that the tubing must be clean annealed.

Two 'Surface' Roller Hearth Continuous Furnaces do the job for Ford at a rate of five tons of tubing per hour, per furnace. Radiant tube heating plus a 'Surface' controlled atmosphere (DX gas) prevents oxidation, eliminates the necessity of a pickling operation.

Shown below is the charge end of one of the 'Surface' Roller Hearth Continuous Furnaces. They are key components in this highly integrated production line that automatically cuts, forms, welds and anneals, rear axle housing tubes from coiled strip stock.

roller hearth furnace anneals steel tubing to take "the bends"



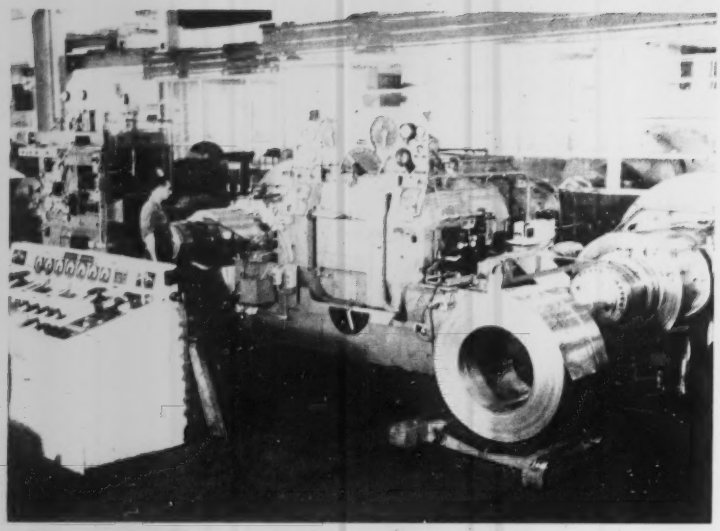
In more than a quarter century of use, 'Surface' Roller Hearths have demonstrated remarkable versatility in heat treatments on tubing, bars, coils, discs, sheets, both ferrous and non-ferrous—carbon restoration, heating for forming, annealing, high-speed stress relieving, hardening and drawing. They use direct firing, convection heating, or radiant tube indirect heating, all incorporating gas-saving, automatic proportioning burner equipment. Take advantage of 'Surface' experience and versatility to boost your production and profits.

Write for 'Surface' Literature Group H-53-3.

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

ALSO MAKERS OF

Kathabar HUMIDITY CONDITIONING *Janitrol* AUTOMATIC SPACE HEATING



View of mill shows Wallingford-developed feeding and back tension machine (left) that allows first pass reduction on Sendzimir mill

Rolling It Is Only Half The Job

Operation of a modern mill involves electric drives, air conditioning, hydraulics, electronic gaging and precision grinding. Wallingford finds itself jack of all trades

INCREASING its market potential by reducing the thickness of metal it can supply, Wallingford Steel Co., Wallingford, Conn., has entered a new branch of the light-gage high-finish strip business with installed capacity of 2500 tons a month.

Specialist in close tolerance stainless and carbon strip and tubing, the company now has facilities for turning out precision strip down to 0.002-inch thickness in widths to 24 inches. Tolerances being held through use of continuous recording gages run ±0.0001 inch for thicknesses below 0.003 inch, ±0.00015 inch for 0.006-0.003 inch sizes and ±0.00025 inch in sizes from 0.015 inch to 0.006 inch.

Fertile Field—For rolling the precision strip Wallingford now has in operation a new Sendzimir reversing cold strip mill capable of 800 fpm delivery speed. Previous facilities could only roll down to 0.005 inch. Growing number of applications for lighter gages at closer tolerances was a deciding factor in the expansion.

Today the booming electronics industry is a big user, as are makers of office machines, cosmetic cases, shoe eyelets, chain and a myriad of other products. One new defense application is insulation blankets in jet planes. A layer of asbestos or glass fiber is packed between sheets of thin stainless and used as a shield between hot sections of the plane and the cockpit.

Heavy Passes—The model ZR-23-25 Sendzimir is a 12-roll cluster type mill backed with 32-inch radial bearings that takes heavy passes with small work rolls to produce a dense structure with reduced intermediate anneals. Work roll diameters are 1.625 inches; intermediate rolls, 2.8 inches and 5.031 inches.

Reductions of 30 to 40 per cent have been made on mild steel. On straight chrome stainless, where fine surface condition is desired, reductions are held to 25-30 per cent to preserve luster. More severe reductions — about 30 per cent are possible with nickel-chromium grades of stainless.

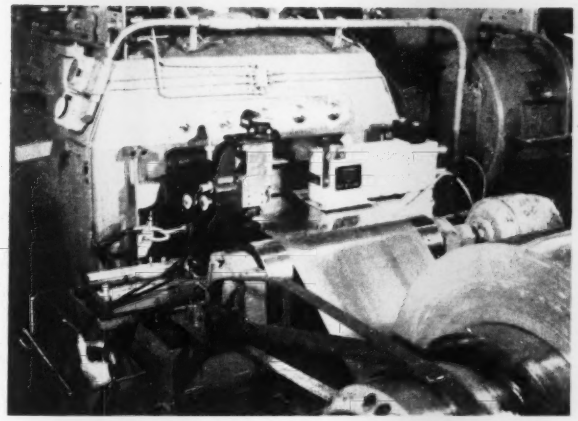
Mechanized—Only two men are required to run the mill, the operator of the DC control panel and a helper. Hydraulically-operated elevators and coil carriages at both ends of the mill allow loading and unloading at either station. Roll coils 22 inches in diameter carry coils up to 60 inches wide and weighing up to 15,000 pounds. Incoming stock of 0.125 inch can be accommodated, but company finds stock of 0.080 inch gives maximum efficiency and utility.

Mill is driven through four of the six second-intermediate back-up rolls by 700-hp mill motor. All drives and controls were supplied by General Electric. Reel motor develops 300 hp and tension of 12,500 pounds at 800 fpm. With magnetic clutch engaging both armatures, reels develop 300 hp and 25,000 pounds tension on each side at 400 fpm.

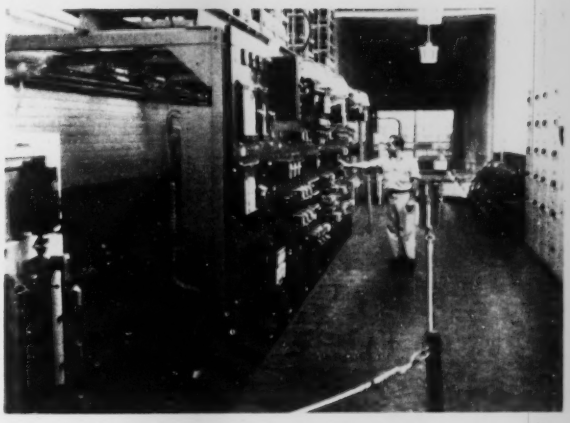
Tension Control — During roll passes absolutely constant tension on strip is maintained by adjustable voltage tension controls with deflector roll generators. Company technicians have found no hunting tendency over full range of tension.

Boon to the mill operator is a memory control rheostat device. It indicates to the electrical equipment the precise diameter of the coils on their respective reels so that tension control will pick up at the proper point regardless of coil diameter. In case of breakage or removal of partial coil, it resets to the proper tension.

Home Grown — Unique feeding and back tension machine developed by Wallingford engineers operates in conjunction with coil payoff reel and makes possible a first pass reduction on the Sendzimir. Normally stock is rewound on mill



Both types of strip gaging, contacting and noncontacting, are mounted on one cross slide. Either one is quickly engaged, depending on thickness of the strip



Air conditioned control room houses dc panel, center, and ac load center at right. Trouble selector shows operator, by indicator light, location of the fault

reel in a blind pass to obtain proper settings and tension.

Control feeder unit aligns strip to enter mill within a few thousandths with straight line accuracy by use of a regulator on feeder unit. Regulator operates with a pneumatic scanning head on one edge of the strip to position payoff reel accurately.

Cool Quarters — Drive motors, control rooms and power substation are air conditioned by a 65,000 cfm system. Converting ac to dc is a 1250-hp synchronous motor-generator set. Control room setup has ac load center on one side and is eased by trouble selector on control panel. If breakdown occurs, technician simply dials "fault switch" and a light indicates the trouble spot.

Heat generated by the heavy reduction passes made necessary installation of a coolant system with greatest relative oil flow of any Sendzimir to date — 400 gpm, pumped from a 9000-gallon reservoir in oil cellar. The same oil is used for coolant and lubrication so great pains are taken to purify it by a combination of flotation units, cartridge filters, centrifuge and fuller's earth clarifiers.

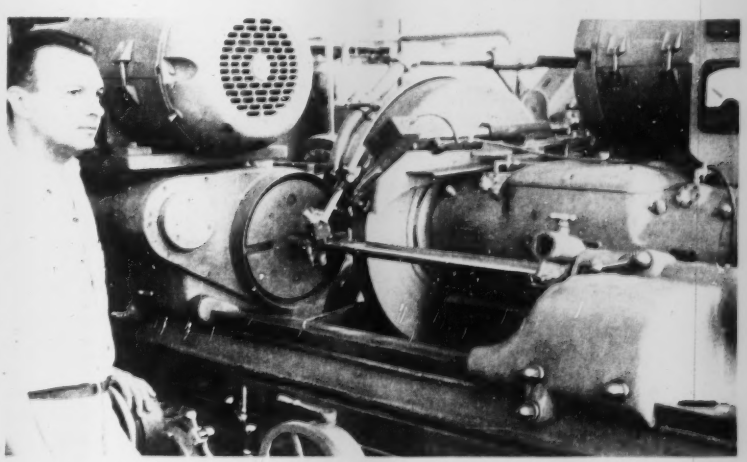
Effective fire protection is guaranteed by a two-charge carbon dioxide unit. One charge is set to release automatically and the other manually. Each charge consists of thirteen 100-pound bottles that flood the entire underground chamber in seconds.

Double Gaging—Process quality control—secret of the company's success in maintaining close tolerances—is aided by continuous indicating-recording gages. Since the Sendzimir rolls both ways, a complete set of gages is provided at both ends of the mill. Contacting continuous gages are used for strip from 0.125 inch to 0.020 inch, noncontacting continuous gage for strip from 0.020 inch down to 0.002 inch.

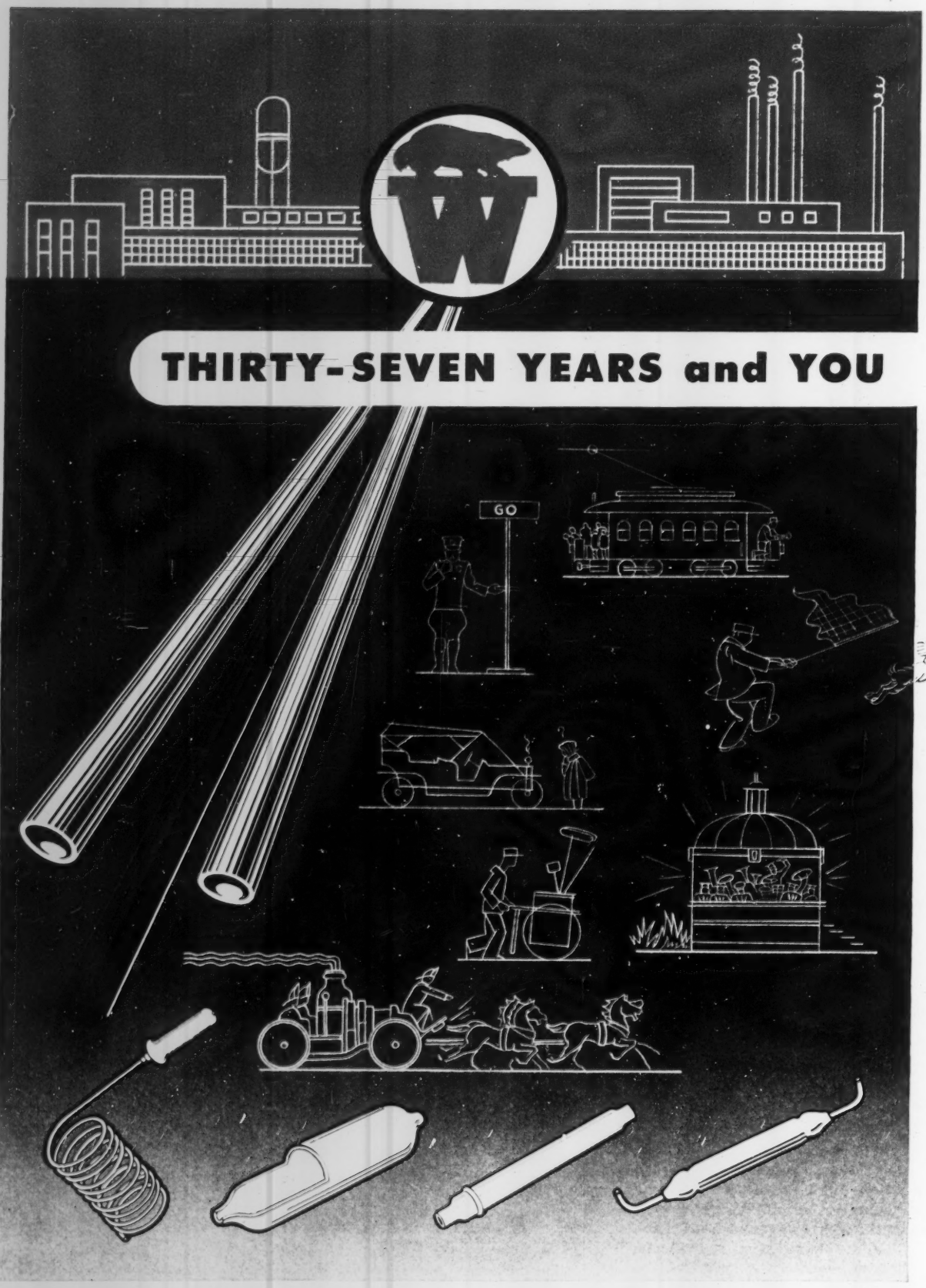
Both gages are mounted on a single cross slide so that either can be engaged or disengaged quickly. All gages connect to meter that indicates instant variations in strip thickness to 0.0001 inch. Continuous recording unit in master control station keeps complete record of all gage readings.

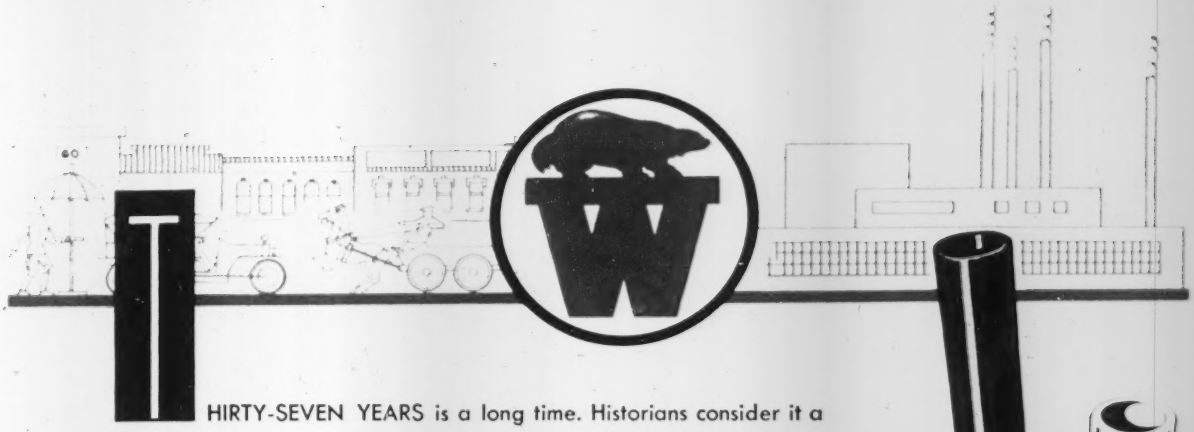
Roll Grinding—Important accessory to the Sendzimir operation is the company's new 9000-sq-ft roll grind department. Servicing the grinders is a central flotation unit to process grinding fluid. As rolls are changed frequently on the mills, rolls must be ground to fine tolerance and proper roll shapes worked out in detail. Each grinder is equipped with recording and indicating devices to plot a curve of the rolls to an accuracy of 0.0000050 inch.

Record of each roll shape is kept on file for comparison study of what happens to it in the mill. Company is experimenting with tungsten carbide rolls in the mill and expects they will afford longer operating life and more lustrous finish.



Precision grinder puts tolerances back into rolls. Operator is watching indicator and recording device plot roll curves to 0.000005 inch


THIRTY-SEVEN YEARS and YOU
GO



THIRTY-SEVEN YEARS is a long time. Historians consider it a generation. Many things happen in that length of time to change our lives. The passing years add experience that guides our forward steps.

Since the start of our business, thirty-seven years ago, many changes have taken place here at Wolverine. Each has been a step forward—the natural result of experience that has been constantly furnishing the inspiration for us to keep looking ahead in search of better ways of doing things, in order that we may bring you the best tube products that human effort, skill, and modern equipment can provide.

Our efforts are not alone confined to the manufacture of tubing, but also to finding ways and means that will make the application of tube most practical—either in the original tube form or as a fabricated tubular part.

As tube specialists, we interest ourselves in both the production of the tube and its ultimate use. We feel it our responsibility to see that Wolverine tube functions to its fullest capacity. We know how to build the finest tube that skill and equipment can produce. And we can fabricate it in any shapes your specifications demand, from the following metals—copper, copper base alloys, electric-welded steel, and aluminum (2S or 3S).

It is reasonable to believe that our progress can help your progress.

WOLVERINE TUBE DIVISION

of CALUMET & HECLA, INC.

Manufacturers of Quality-Controlled Tubing

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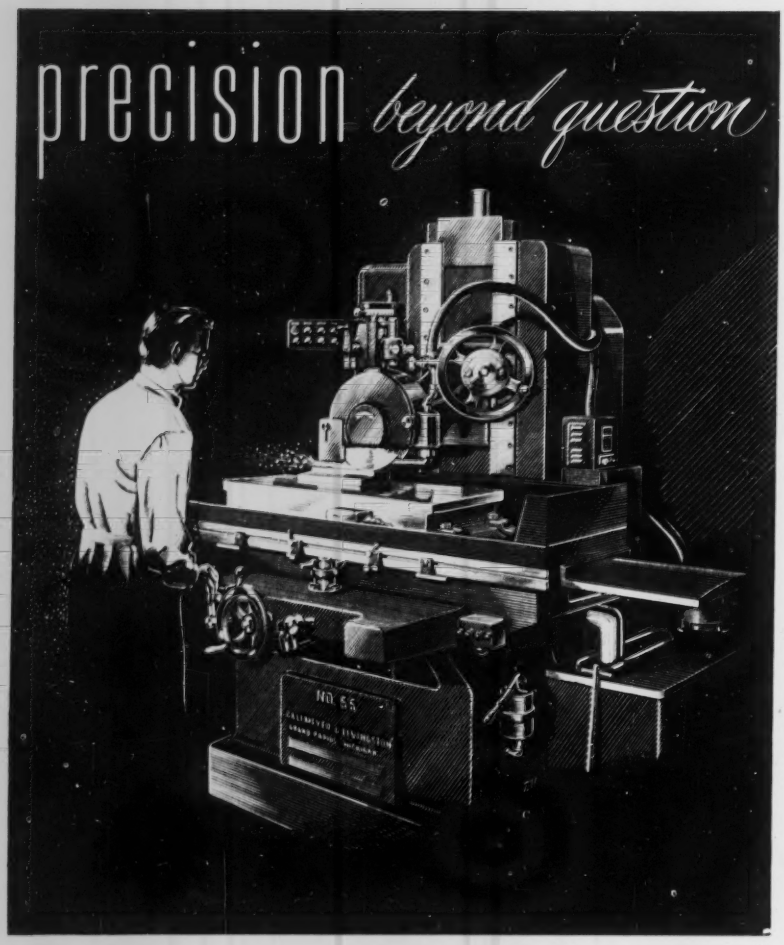


The requirements exacted of surface grinding machines leave no room for variation. Precision and tolerance control must be built-in. Through the years Grand Rapids Grinders have demonstrated the highest quality and unquestioned dependability of performance. Upon this record they have been accorded world-wide acceptance as standard of the industry. Here is precision beyond question.

GALLMEYER & LIVINGSTON CO., 307 Straight Ave., Grand Rapids, Mich.

GRAND RAPIDS GRINDERS

MANUFACTURERS OF SURFACE GRINDERS, CUTTER AND TOOL GRINDERS, TAP AND DRILL GRINDERS

GALLMEYER & LIVINGSTON

References for Industry

Standards Booklet Revised

"Standards Are Your Business," a 24-page booklet defining standards of production and their value as tools of management, appears in a revised edition issued by American Standards Association.

Booklet gives philosophy and objectives of the voluntary standards movement in this country and includes a section on Federal Government policy toward industry standards.

Copies are available without charge from American Standards Association, 70 East Forty-fifth Street, New York 17, N. Y.

Aluminum for Wire

Handbook describing uses and properties of aluminum for power and lighting wire has been published by the electrical wire and cable department of United States Rubber Co.

Contained in the 30-page booklet are eight tables referring to various properties of this wire including insulation, current-carrying capacity, comparison of weights, breaking strength.

Copies may be obtained from the electrical wire and cable department, United States Rubber Co., Rockefeller Center, New York 20, N. Y.

Storage Battery Manual

Publication of a revised storage battery service manual has been announced by Robert L. Sommerville, president, Association of American Battery Manufacturers. First issued in 1943, the publication is now in its third edition.

The booklet covers in non-technical language how a battery is constructed, how it works, how to maintain battery stock, how to install and service automotive batteries, and how to make certain battery repairs.

Copy of the 44-page publication, entitled "Storage Battery Technical Service Manual," may be obtained by writing Association of American Battery Manufacturers, 2706 First National Tower, Akron.

NEW

Cuts Downtime . . . and Hoisting Costs

NEW **Tuffy HOIST LINE**

High Performance Records are the rule, wherever Tuffy Slings are used! Tuffy Slings, with patented 9-part braided wire fabric construction, have become leader in a relatively few years . . . proved their *extra* value to men who must keep sling costs down, safety records clear.

Now, New Tuffy Hoist Line, especially constructed for overhead, stiff leg and mobile cranes, derricks and clam shells, matches Tuffy Slings in flexibility, wearability and super-toughness! Tuffy engineers developed a hoist line that passes safety checks after other ropes wear out! Tuffy Hoist Line absorbs load shock and stays on the job much longer than other ropes—according to actual in-use reports!

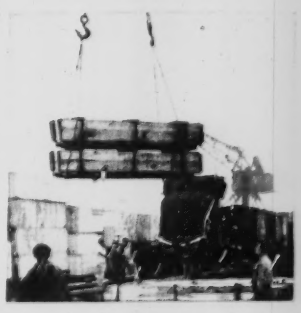
No Ordering Troubles, since you just fill in diameter, length and "Tuffy Hoist Line." No chance for confusion, no complicated specifications! Find out *why* Union engineers are betting their reputations Tuffy Hoist Line will deliver longer service than *any* rope construction used for hoist line. Reeve your crane with Tuffy and see the difference!

WRITE for the 48-page Sling Handbook and Rigger's Manual and information on *new* Tuffy Hoist Line!

More and More Distributors are Switching to the

TuffyTeam!

No complicated specifications means fuller distributor stocks for faster service! And, there's a Union Wire depot or warehouse near to back him up! For hoist line, give length, diameter and the name Tuffy for slings, sling type, diameter, length and fittings! Or, buy Tuffy braided wire fabric on the reel if you do your own rigging!



union corporation

2160 Manchester Avenue • Kansas City 26, Mo.

HIGH SPEED FLAT WIRE MILLS

These high-speed Torrington units are designed to roll flat wire at high production rates. Available in a wide variety of sizes with automatic controls, they provide maximum flexibility. Combinations of two or three flattening stands together with edgers accommodate a great variety of work. Handles 4,000 lbs. weight at entry, up to 1,000 lbs. on winder, with speeds as high as 3500 FPM and more. All operations can be performed by power—pneumatically, hydraulically or by electric motor—under operator's control at a main pulpit or at control stations advantageously located.

THE

TORRINGTON

MANUFACTURING COMPANY

TORRINGTON, CONNECTICUT

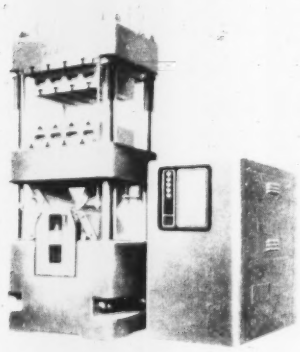
NEW PRODUCTS and equipment

Reply card on page 143 will bring you more information on any new products and equipment in this issue

Improved Toggle Press

. . . molds delicate inserts

This redesigned semiautomatic compression molding press is especially suited for molding delicate insert parts. The manufacturer reports applications for making resistors, capacitors and similar plastic molded parts. Press is equipped



with patented bar controller that gives positive mechanical control over every phase cycle.

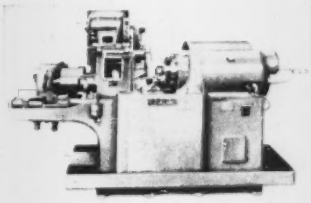
Color-coded electrical circuits throughout are a major improvement in the redesigned unit, simplifying maintenance and servicing. Another is use of seamless steel tubing for all oil lines. A three-stage automatically-controlled closing action reduces closing time and speeds production cycle. F. J. Stokes Machine Co., Dept. ST, 5500 Tabor Rd., Philadelphia 20, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Single-Spindle Automatic

. . . spindle speeds: 69-1920 rpm

Simplified mechanical design that provides easy operation and maintenance is a characteristic of this 2½-inch model AW single spindle automatic screw machine. Efficient cutting speeds are provided by the 40 spindle speeds ranging from



69 to 1920 rpm. Four automatic speed changes are available, both forward and reverse, for each set of change gears.

Length of bar stock feed can be set easily by a simple hand crank adjustment and is indicated on a scale bar. A motorized chip conveyor is available and can be used to remove chips through an opening under the spindle head at the stock feed end. Cleveland Automatic Machine Co., Dept. ST, Cincinnati 12, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Production Soldering Iron

. . . fast soldering, small tips

Electric soldering iron is designed for use on production lines where greater speed is required

from an iron with a small tip diameter. The iron is plug tip type, rated at 100 w, but has ¼-inch tip instead of conventional ⅜-inch diameter tip.

It reaches and maintains a temperature reported to be considerably beyond that of the conventional 100 w ⅜ inch tip. Hexacon Electric Co., Dept. ST, 139 W. Clay Ave., Roselle Park, N. J.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Motor-Mounted Belt Sander

. . . bench anchoring unnecessary

This 1-inch width belt sander is designed for jobs in machine and plastic shops. The sander is built

to mount on motor; anchoring to bench is unnecessary. It can be used as portable equipment, is well balanced with minimum vibration.

Semiautomatic, self-leveling belt tension adjuster can use 42 to 46-inch length belts. Sander is designed with reversible tilting work table. John P. Fox Co., Dept. ST, 5514 York Blvd., Los Angeles 42, Calif.

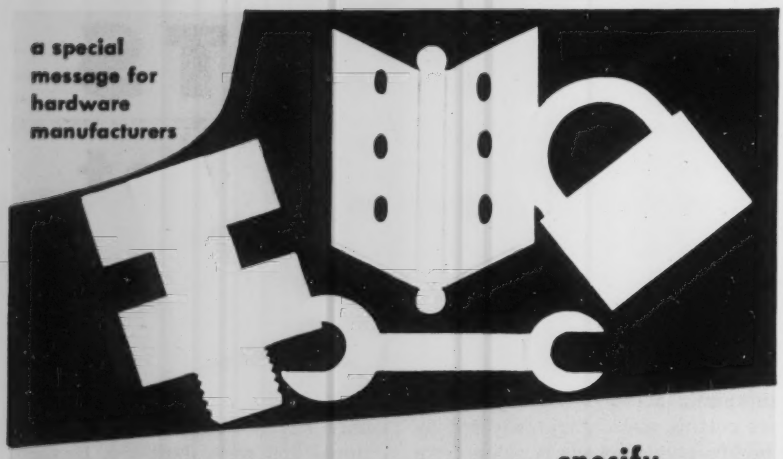
FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Welding Positioner

. . . elevates or rotates 360°

Any point on a weld job can be positioned for efficient downhand welding with this positioner. The model, 3MBT (3-motor balanced

a special message for hardware manufacturers



need a finish for protection—decoration—identification? specify IRIDITE®

Specify Iridite . . . for corrosion protection during storage or use . . . for a firm and lasting base for paint . . . for extra quality and eye-appeal . . . for low cost color coding of finished parts.

- **ON ZINC AND CADMIUM** you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.
- **ON COPPER . . .** Iridite brightens copper, keeps it tarnish free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.
- **ON ALUMINUM** Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.
- **ON MAGNESIUM** Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

WANT TO KNOW MORE? We'll gladly treat samples or send you complete data. Write direct or call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book.

Iridite is approved under government specifications

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INCORPORATED
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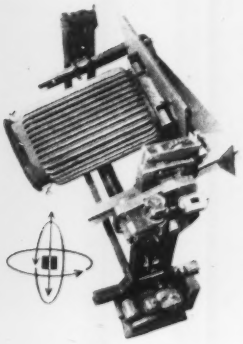
Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals, ARP Plating Chemicals.
WEST COAST LICENSEE: L. H. Butcher Co.

NEW PRODUCTS and equipment

type), provides three degrees of freedom: Horizontal, vertical and elevation.

While positioning is done automatically by pushbutton, the load is swung about a neutral axis.



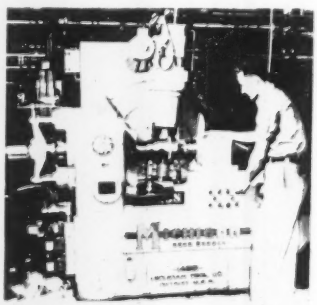
Maneuverability is unlimited. It will lift the job and turn it 360 degrees vertically, or horizontally, raise and turn it completely over for welding high side areas. Standard models are available in eight different capacities for positioning jobs ranging in size from 500 to 20,000 pounds. Pandjiris Weldment Co., Dept. ST, 5151 Northrup, St. Louis 10, Mo.

FOR MORE DATA—CIRCLE REPLY CARD NO. 5

Production Hobbing Machine

. . . provides fast changeover

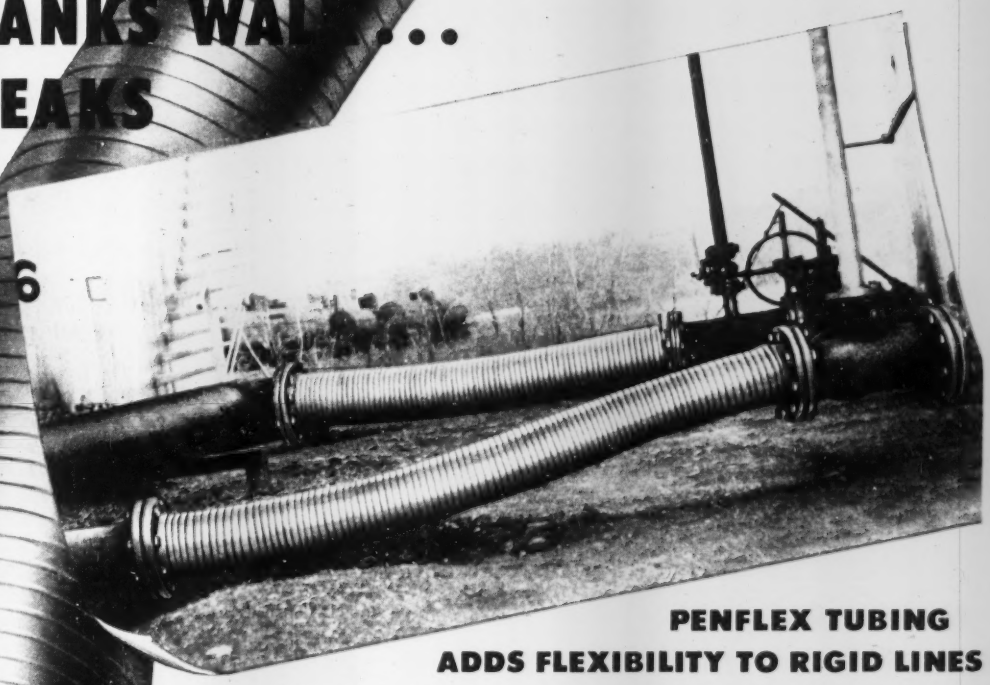
This production hobbing machine has an advantage of quick changeover to handle a variety of parts. To make a change from



one spur gear to another of different diametral pitch and number of teeth, all that is required is removal of the hob and replacing the proper ratio gears, plus removal and replacing of hob speed gear if necessary.

Fixtures are then taken off and

LETS TANKS WA... NO BREAKS



PENFLEX TUBING ADDS FLEXIBILITY TO RIGID LINES

Large storage tanks must move with the heat or cold. Rigid connections on one installation were constantly breaking. Flammable liquids leaked out . . . a fire hazard was created, material lost and maintenance costs rose.

The answer was a length of 12" I.D. Penflex four-wall interlocked flexible tubing installed with tight-packed flanges. Tanks can now "walk" with the weather, tubing is tight as a pipe and no special supports were necessary for installation.

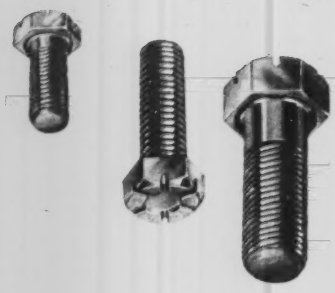
In industries wherever the conveying of liquids, gases or granular materials for storage tanks, engines, compressors or other types of equipment is necessary with flexibility, you'll find Penflex "Flexineering" has the answer. Penflex manufactures a complete line of four-wall interlocked and seamless welded corrugated flexible tubing . . . metallic hose, tubing or couplings from $\frac{1}{8}$" I.D. and up . . . automatic barrel fillers, accessories and fittings.

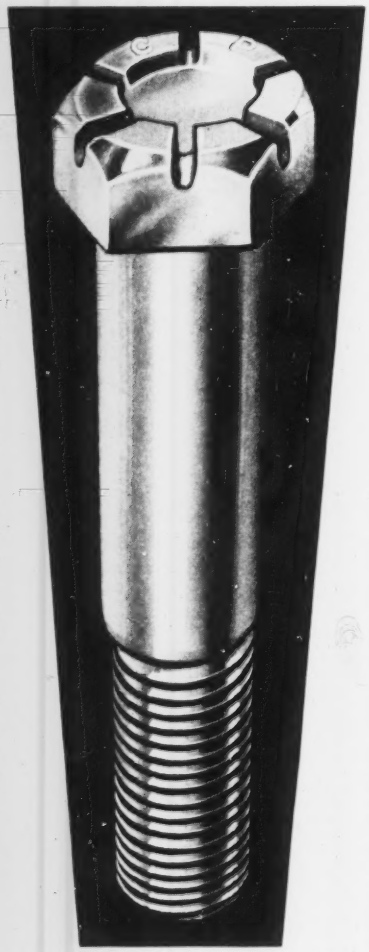
Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: Boston • New York • Chicago • Houston • Cleveland • Los Angeles

PENFLEX

HEART OF INDUSTRY'S LIFE LINES

cold forged **precision** **cap-screws**





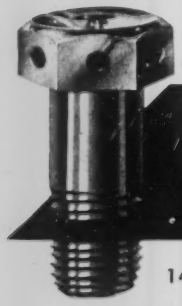
CHANDLER fasteners are manufactured to the highest standards of precision, uniformity and economy of assembly. **CHANDLER** specializes in one thing only . . . cold forged metal fasteners of the finest alloy steel, made to exacting specifications.

CHANDLER is prepared to render highly specialized or standard fasteners to your complete satisfaction. To make assembly faster, every fastener must pass rigid inspection, insuring uniformity, accuracy and good appearance.

CHANDLER supplies every industry with the very finest cold forged precision cap screws. Automotive, aviation, transportation, farm implement . . . whatever your needs — **SPECIFY CHANDLER.**

Write today for catalog

1303 CH



Specialists in Thread-Rolling after Heat-Treating

CHANDLER PRODUCTS CORPORATION

1488 CHARDON ROAD • CLEVELAND 17, OHIO

replaced with the next set. This requires removal and replacing of four bolts each on headstock and tailstock. Changeover time is about 45 minutes, reduced slightly on small parts by turning the parts on an arbor. Michigan Tool Co., Dept. ST, 7171 E. McNichols Rd., Detroit 12, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 6

Split Roller Bearings

. . . simplify difficult locations

Components of these bearings are split down to the shaft to permit application where it is difficult to mount conventional type solid ball or roller bearings. Split feature does not limit use of this type, according to the manufacturer.

Halves of the inner race are clamped onto the shaft with locking collars. Bearing assembly is

completed by placing the halves of the outer race in position. Split cartridge or other split housing is fixed around bearing, which is then ready for use. Cooper Split Roller Bearing Corp., Dept. ST, 700 Cedar Blvd., Pittsburgh 28, Pa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 7

Profile Miller

. . . any profile or contour line

Model A-42 profile milling machine offers excellent production capacities in work on aluminum and similar metal parts. Chief feature of its design is the manufacturer's co-ordinated tridirectional

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9	19	29	39	49	59	69	79	89
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70. V-Belt Clutch

V-Belt Clutch Co.—Features, operational details and complete specifications for line of Ball-Lok V-belt clutches are found in 8-page catalog No. 31. Applicable to gas engine and electric motor drives, they are made in one, two, three and four-belt models. All have ball bearing shifter collars.

71. Torch Guiding Machine

Heath Engineering Co.—Available literature pertinent to the Ultra-Graph, an oxy-acetylene torch guiding machine, includes 4-page folder which describes machine, some applications and gives specifications. Supplementary 6-page folder gives instructions for setting up machine, operation and use of patterns, and 4-page folder describes a circle-cutter attachment.

72. Perforated Metals

Diamond Mfg. Co.—32-page catalog 39 on "Perforated Metals for Every Industrial Application" pictures and describes line of round, square, oblong and ornamental perforations ranging in diameter from 0.02 to 9.5 in. It also gives hole sizes, open areas, gage limits and other information useful to engineers and designers.

73. Process Controllers

Minneapolis-Honeywell Regulator Co., Brown Instruments Div.—56-page illustrated catalog 1530 "Electronik Controllers" features instruments used to measure and control a multiplicity of process variables. Both electric and pneumatic types are covered, including relays. Engineering data tables and other useful information are provided.

74. Split Roller Bearings

Cooper Split Roller Bearings Corp.—Featured in 16-page brochure on split roller bearings are tabulated bearing, cartridge and pillow block dimensions for medium, heavy and extra heavy models. Instructions for selection of proper bearing, detailed drawings as well as sealing and lubrication data are included. Split feature of bearing enables it to be used where it would be impractical or impossible to mount solid ball or roller bearings.

75. Speed Recorders

Metron Instrument Co.—Ruggedized strip chart recorders in a wide choice of speed ranges from 0-50 to 0-10,000 of any desired units are detailed in technical data sheet No. 81M. Instruments will record continuously for as long as 30 days. They are designed for semiflush panel mounting.

76. Honing Equipment

Micromatic Hone Corp.—Vertical and horizontal honing machines, tools and accessories are described in illustrated 16-page general catalog. New machines added to line include 30- and 50-in. stroke verticals with work capacities up to 8-in. diameter by 10-in. long as well as a 12-ft stroke horizontal machine.

77. Liquid Drives

G. E. Nelson Co.—Liquid Drive Div.—Traction type liquid drives including sheave, flexible coupling and hub mounted types are described in engineering data folder No. 6000. Horsepower range of units is from 15 to 60. Complete construction, application and general data are given, together with much engineering data in report form.

78. Wall Deslagger

Continental Foundry & Machine Co.—Copes-Vulcan Div.—How dual motor drive and high striking power are combined in the Vulcan wall deslagger to clean water wall slag build-up is related in illustrated bulletin 1016 of 4 pages. Sketches and cut-away view show construction.

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79. Oil Gelling Agent

National Lead Co., Baroid Sales Div., Bentone 34, a non-gap gelling agent, has its properties described and its applications related in this 18-page illustrated bulletin. How it is made, how it works, how Bentone greases are made and advantages and properties of Bentone-greases are covered.

80. Gas Shielded Welding

General Electric Co.—Three illustrated bulletins of 8, 8 and 4 pages describe the Fillerare consumable electrode gas-shielded welding process. Design and manufacture of equipment, application information and operating data and specifications are contained in the three bulletins, GER-819, GEA-6028 and GEC-989.

81. Nonskid Flooring

Monroe Co.—Swift-Floor floor resurfacing and repair material containing a material with irregularly shaped crystalline structure forms a hard, resilient and nonskid surface. Application methods, features and other data are given in form 62-8. Material withstands service loads up to 50,000 lb.

82. Herringbone Gear Drives

Link-Belt Co.—36-pages of illustrated book 2519 contain a wealth of information on herringbone gear drives. Types and sizes, application data, design details, complete specifications, engineering data, ratings and prices are included. They are made with single, double or triple gear-and-pinion sets for wide range of speed ratios.

83. Chemical Steel Polish

McDermid, Inc.—Data sheet No. 32 describes Mirro-Fe, a room temperature chemical steel polish that produces with one-minute immersion a luster equivalent to 30-minute bright nickel deposition. It can also be used for polishing dies to give longer life and imparts slight corrosion resistance.

84. Centrifugal Blower

Eclipse Fuel Engineering Co.—Constant air supply for all types of combustion equipment is provided by the centrifugal pressure blower described in illustrated 8-page bulletin K-100. Pulley drive, double bearing, single inlet and V-belt drive types have their features, details and specifications given.

85. Starting Switches

Allen-Bradley Co.—24-page illustrated wiring diagram booklet offers information on the many ways the Bulletin 709 magnetic across-the-line starter can be applied. Each wiring system is shown in two ways: a wiring diagram and a line diagram. They are included for all sizes of starters; one, two and three-phase systems; jogging; two-wire control; pump operation; thermostat control; sequence control; and other.

86. Insulation Materials

Houghton Laboratories, Inc.—Bulletin on Hysol 3000 Series plastisols has 4 illustrated pages showing how these polyvinyl chloride resins dispersed in selected plasticizers are used for corrosion protection, abrasion resistance and electrical insulation. Formulation and application techniques are considered.

EDITORIAL ARTICLES

Available in Limited Quantities

87. Needle Tube Production

Manufacture of needle tubing isn't merely a matter of drawing little ones out of big ones. Nature of the finished product and its uses demands sharp tolerances and some tricky heat treating. The complexity of job and how it is done at Superior Tube is described in STEEL article "Needle Tube Production."

88. Treatment of Titanium

Progress being made in improving surface properties of titanium is reported in STEEL article "Surface Treatment of Titanium." Researchers are producing hard surfaces with purified nitrogen and nitrogen gas, gas carburizing and induction heating. Silicon coating affords protection against oxidation.

89. Disk Grinding Problems

STEEL article "Smooth Out Your Disk Grinding Problems" by J. K. McLaughlin will tell you how to get more mileage out of your abrasive disks and a better product, too, by avoiding five of the most common disk grinding faults. These are burned spots, deep scratches, flat areas and depressed spots, circular grinding marks and wasted disks.

90. Strip Rolling Pressures

Some recent results of roll pressure measurements on full-size continuous hot and cold strip mills are brought to light in STEEL article "Evaluating Rolling Pressures in Hot and Cold Strip Mills" by N. H. Polakowski, Sendzimir Ltd., London. Rolling forces in four and six-stand hot strip roughing and finishing mills and rolling pressures in two five-stand tin plate mills are tabulated.

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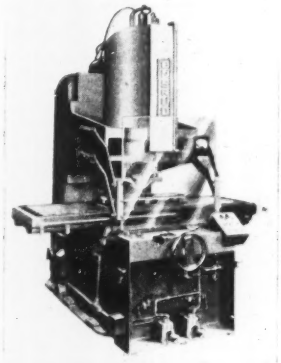
feed system. This makes possible milling to any profile or contour line without slow-down of feed at any point.

Designed for profile milling, the model offers equally high production in straight line work. For this purpose, table dogs can be set



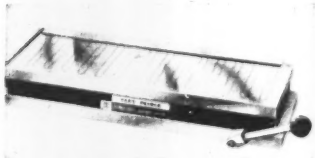
to control length of table travel in either longitudinal or transverse feed. In profile milling, accuracy will be equal to that of template. In straight line milling, accuracy is assured by over-all rigidity of the machine's construction. Onsrud Machine Works Inc., Dept. ST, 3942 Palmer St., Chicago 47, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 8

Permanent Magnet Chuck

. . . height lowered 20 per cent

This permanent magnet chuck, an addition to the manufacturer's line, emphasizes compact design to



achieve lower height. Result is increased clearance between wheel and chuck. At the same time, incorporation of more magnetic poles

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JEWEL BRAND

Abrasive Belts

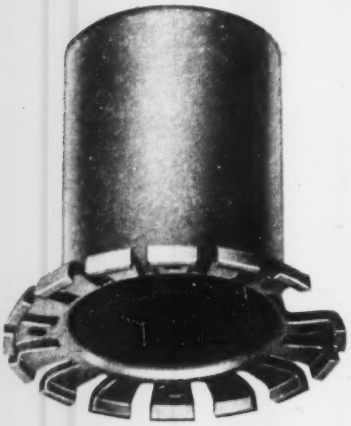
for grinding, sanding, polishing — metal, wood, leather, plastics, rubber.

ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85, Massachusetts

EACH MAN TO HIS TRADE

When it comes to metal stampings — WSM has been forming and deep drawing all kinds of light, medium and heavy component parts to exact specifications for 70 years.

Many stampings have been redesigned for lighter weight, less bulk and added strength — at reduced unit cost.



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Let us help you save production time and money through our familiarity with stamping problems—both new and old.

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10 HUNT ST., WORCESTER, MASS., U. S. A.

SPECIALISTS IN SKILLED STAMPING SERVICE

GET *RAPID-FIRE PRODUCTION*

from your PUNCH PRESSES

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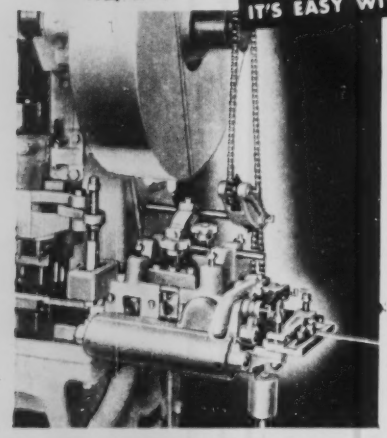


Automatic Roll Feeds

Wittek automatic roll feeds fit all makes and sizes of punch presses—provide maximum efficiency and extreme accuracy in the high speed automatic feeding of strip stock. Made in single roll, double roll, and compound types with straighteners, in models to feed (push or pull) in any direction. Length of feed is easily adjusted to meet individual requirements.

4473

WITTEK Reel Stands

Simplify Handling of Coiled Stock

Choice of standard models to facilitate handling coiled stock . . . from small, light coils to those weighing up to 800 pounds. Larger reel stands automatically center the coils — provide frictional braking action to prevent overrunning, maintain uniform coil slack.

Write for Full Particulars

WITTEK Manufacturing Co.
4328 W. 24th Place, Chicago 23, Illinois

Automatic ROLL FEEDS AND REEL STANDS

NEW PRODUCTS and equipment

with relation to chuck length makes possible greater effective work holding area.

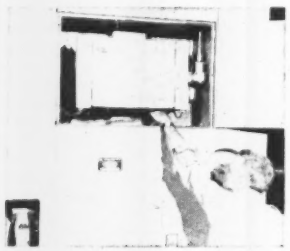
Holding power is controlled by progressive positioning of the hand lever, from minimum to maximum, providing advantages in holding certain types of work without distortion. No electrical current is applied; chuck operates without heat. Taft-Peirce Mfg. Co., Dept. ST, Woonsocket, R. I.

FOR MORE DATA—CIRCLE REPLY CARD NO. 9

Rotary Cam Limit Switch

. . . adjustable during operation

Developed to meet specific needs of mechanical press automation devices, this rotary cam limit switch permits external adjustment during operation of the press. This



simplifies synchronizing to press cycle of independently powered press auxiliaries, since the press can be stroked while individual switches are being adjusted.

Two sizes of limit switches are available. The smaller holds up to 12 cams; the larger, up to 22 cams. Danly Machine Specialties Inc., Dept. ST, 2100 S. Laramie Ave., Chicago 50, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Industrial Flooring

. . . uses steel mesh and filler

Packaged unit heavy-duty flooring, called Steel-Rock, combines heavy steel mesh and special filler as a complete unit for surfacing floors subjected to extra-tough abuse. Manufacturer says its floor out-lives the building itself. Prime advantages are reported to be ability to withstand impact as well as heavy loads.

Resilient filler used in the grid compacts to meet the level of steel ribs, thereby permitting wheels to

POLLOCK

IMPROVED HANDLING EQUIPMENT TO EXPEDITE OPERATIONS

an important factor in increased open hearth production

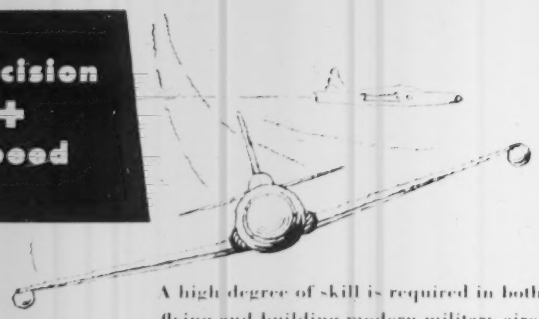
• Pollock experience in the development and construction of open hearth equipment assures smooth flow of operations. To measure use-value of Pollock handling equipment, add their day by day engineering research to 85 years of producing for the steel industry. General specifications available on request. Special-performance details engineered for your needs.

POLLOCK
SINCE 1863

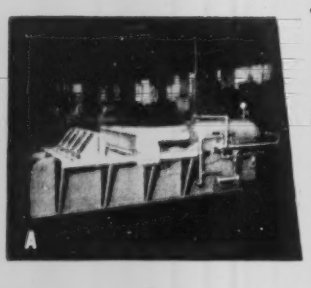
THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN • OHIO
STEEL PLATE CONSTRUCTION • ENGINEERS • FABRICATORS • ERECTORS

BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES

precision + speed



A high degree of skill is required in both flying and building modern military aircraft. BEATTY machines, like the latest of the supersonic jet jobs, are precision-built to afford maximum accuracy and speed in metal fabricating operations. Let a BEATTY engineer analyse your industrial machine needs—if one of the machines shown doesn't answer your production problem, we'll design and build one to your exact requirements.



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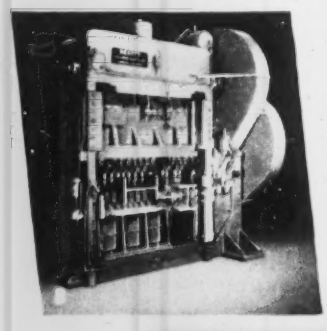

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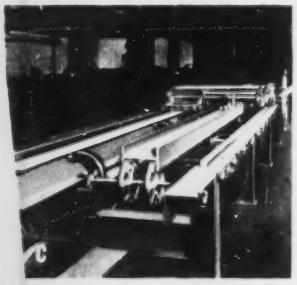


C

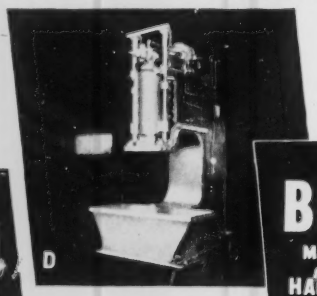
A. BEATTY Horizontal Hydraulic Bulldozer for heavy forming, flanging and bending.

B. BEATTY Guillotine Beam Punch. Punches webs and flanges in "I" beams from 6 to 30 inches.

C. BEATTY Spacing Table handles web and flange punching without roll adjustment.

D. BEATTY Gap Type Press for forming, bending, flanging, pressing. Capacity 250 tons.

E. BEATTY Guillotine Bar Shear for angles, bars, rounds, squares without changing tools.



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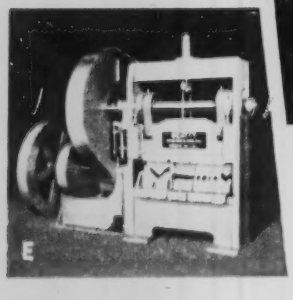
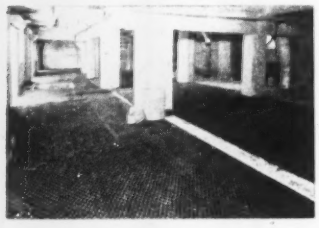


E

BEATTY
MACHINE & MFG. CO.
HAMMOND, INDIANA

ride on steel without noise and slippery surface of solid steel. Product can be applied over new or old surfaces of wood or concrete, inside or



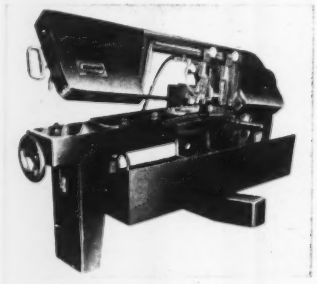
outside, at a depth varying from 3/8 to 1 inch. United Laboratories Inc., Dept. ST, 16801 Euclid Ave., Cleveland 12, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Metal Cutting Band Saw

. . . minimum kerf, no burr

Model 8C horizontal metal cutting band saw cuts 8-inch round stock, 16-inch flat stock, 8-inch pipe and a variety of shapes including very thin sections. It cuts



with accuracy of a few thousandths with a minimum of kerf and leaves no burr.

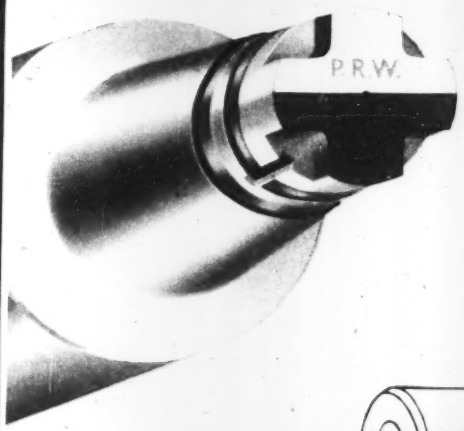
Saw frame descent through the sawing operation is correctly maintained by a hydraulic mechanism. All parts are completely enclosed and blade changes can be made in a matter of seconds. Machine Tool Division, Kalamazoo Tank & Silo Co., Dept. ST, 160 Harrison St., Kalamazoo, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 12

Hydraulic Guillotine Cutter

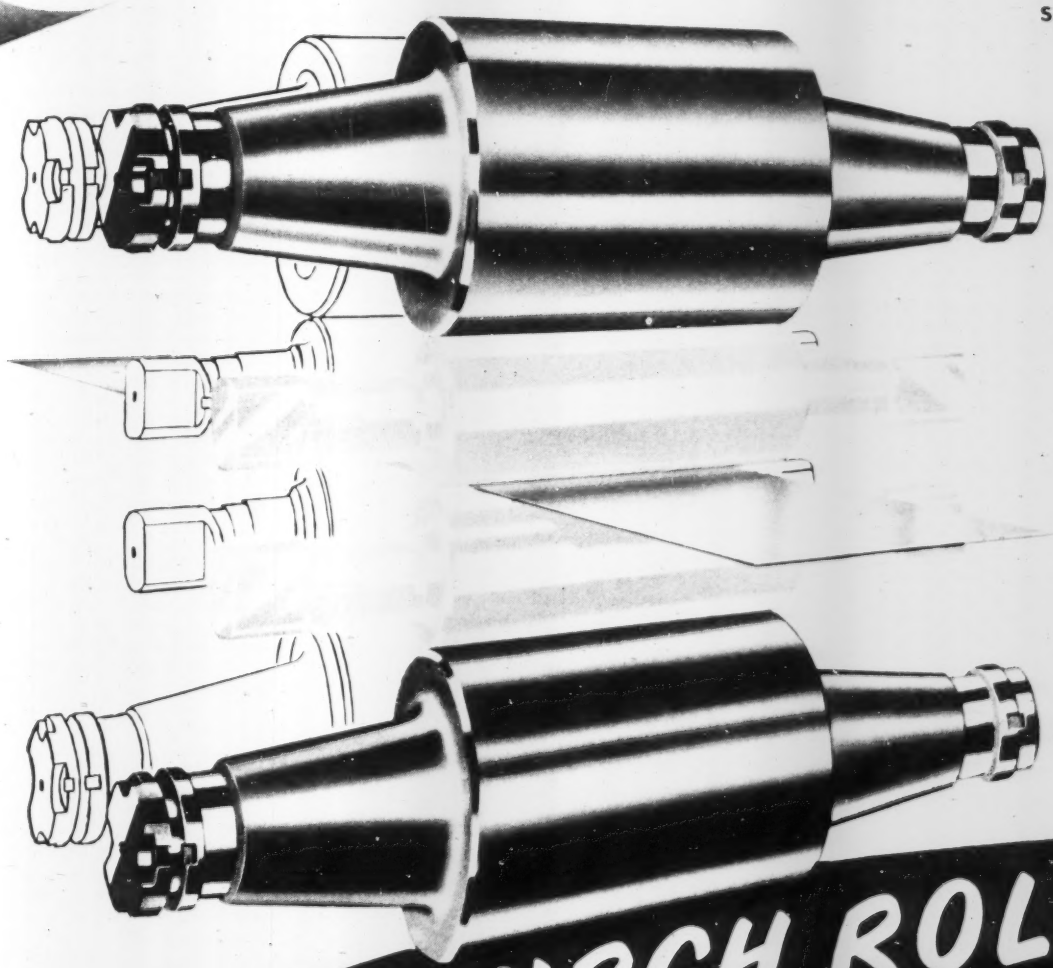
. . . takes 4.2 seconds per shear

This hydraulic Guillotine unit is capable of shearing mild steel strips 5/16 x 25 inches. It is built for use in cutting coiled strip stock. Cutter takes 4.2 seconds to



PHOENIX "A" BACK UP ROLLS are color marked for specific uses in rolling . . .

HOT AND COLD STRIP MILLS AND PLATE MILLS



PITTSBURGH ROLLS

BLAW-KNOX COMPANY • PITTSBURGH ROLLS DEPARTMENT • PITTSBURGH, PA.

OTHER PITTSBURGH ROLL TYPES

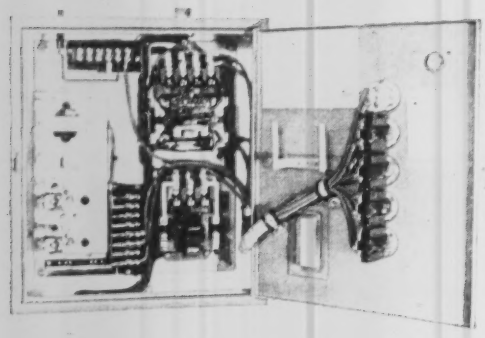
- Chill
- Moly Chill
- Special Rail Finishing
- Phoenix "K"
- Pittsburgh Grade 25
- Pittsburgh Grade 35
- Pittsburgh Grade 45
- Pittsburgh Grade 55
- Pittsburgh Grade Special Process
- Phoenixloy
- Phoenix Metal
- Phoenix Metal Master
- Carbon Steel
- Phoenix "A" Alloy Steel
- Phoenix "A" Special Alloy Steel

P.R.W.

WHEN YOU HAVE A CONTROL PROBLEM

FEDERAL NOARK®

CAN SOLVE IT



Federal Noark control unit for a New Jersey Machine Corporation's labelling machine that eliminated costly switch and relay chattering. Above is opened unit showing electronic brain, Federal Noark manual and magnetic motor starters and oil tight push button switches.

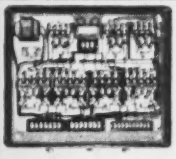
CUSTOM DESIGN and the manufacture of complete control panels is a very important part of Federal Noark business. It has proved the perfect solution for hundreds of control problems, and always incorporates standard Federal Noark Motor Controls that are outstanding for their simplicity of design, efficiency of operation, and easy, low-cost maintenance.

Whenever you have a control problem, submit it to us. Federal engineers will find the solution, and Federal Noark will build the control units required for top service and economy.

FULL LINE OF MOTOR STARTERS UP TO 400 H.P., 600 VOLTS, A.C.

BULLETIN 504

Across-the-line Magnetic Motor Starters in sizes 0; 1, 2, and 3 . . . the heart of today's most elaborate controls. Only one moving unit . . . coils changed in seconds.

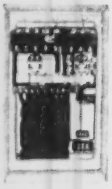


BULLETIN 534R

Magnetic Multi-Speed Starters with full selective control up to 4-speed. Overload protection.

BULLETIN 514

Combination Non-Reversing Motor Starters with front-operated motor circuit disconnect switch, permitting close ganging. Thermal overload protection. **BULLETIN 515** Combination Non-Reversing Motor Starters with air circuit breaker.



BULLETIN 554

Reduced Voltage Magnetic Compensator Starters with adjustable pneumatic timer and overload protection.

BULLETIN 950

Solenoid Type Relays in any combination of normally open and closed circuits, up to 12 circuits. 0 to 600 volts.

PUSHBUTTON STATIONS

A complete line of standard and heavy duty stations in watertight enclosures as well as for hazardous locations. Surface and flush mounting.

OTHER NOARK STARTERS

BULLETIN 424

Reversing Manual Motor Starters.

BULLETIN 434S

Two-Speed Manual Motor Starters.

BULLETIN 454

Manual Reduced Voltage Starter.

BULLETIN 502

Magnetic Contactors with auxiliary contact for 3-wire control.

BULLETIN 522

Reversing Contactors.

BULLETIN 524

Reversing Starters with thermal overload protection.

BULLETIN 528

Combination Reversing Starters with motor circuit disconnect switch.

BULLETIN 529

Combination Reversing Starters with air circuit breaker.

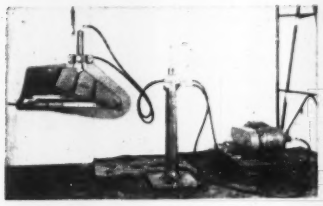
For complete specifications write to Federal Electric Products Co., Industrial Control Division, 1429 Park Street, Hartford 1, Conn.

Federal Noark products: Stab-lok Circuit Breakers, Motor Controls, Safety Switches, Service Equipment, Industrial Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct — **Pacific Electric Manufacturing Company products:** High voltage circuit breakers and power switches ★ Sales offices in principal cities.

FEDERAL NOARK®

make the shear. And the shearing head, which weighs 600 pounds, can be suspended from a spring tension balancer to be easily positioned over the strip.

A manual valve control actuates



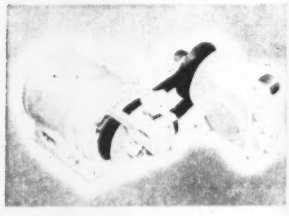
the unit. There are no solenoid switches. Power comes from a 2 hp electric hydraulic pump. Manco Mfg. Co., Dept. ST, Bradley, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Expanded Drive Speeds

. . . adapts to any reducer

Variable speed disk assembly makes possible new low speeds for this model Flexi-Speed drive. These low speeds make the drive adaptable for driving at recommended



speeds to practically any gear reducer, either worm or helical.

Latest model can be mounted in almost any position around the driven equipment, may drive in any direction and can deliver any desired speed within a 6:1 ratio. The drive also offers maximum in mounting flexibility. Six different belt lengths offer a wide choice of shaft center distances. Reeves Pulley Co., Dept. ST, Columbus, Ind.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Automatic Machine Feeder

. . . feeds coil at 90 fpm

Device for feeding all types of coiled stock to production machines has automatic trip bar that actuates a motor switch as the slack loop is tightened. The motor then feeds a new loop at 90 fpm

the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS AT LOWER
C COST

Michigan Electric Resistance WELDED STEEL TUBING

A Quality Product

ROUND
3/8" to 4" O. D. 9 to 22 gauge
SQUARE-RECTANGULAR
1/2" to 2" 20 gauge, 1" to 2 3/4", 14, 16, 18 gauge
Carbon 1010 to 1025

Michigan Tubing has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Washing Machine Center Tube Shaft

The meticulous workmanship that goes into every piece of Michigan tubing is well illustrated by the center tube shaft manufactured by Michigan for a washing machine.

In the production of this part, absolutely accurate finishing to the closest tolerances is required. For example: at the head—I. D. plus or minus .001, O. D. plus or minus .003. Tube O. D. is 2.50 inches, with .120 gauge thickness. Michigan's know-how and modern precision and production equipment makes it a simple matter to conform to close tolerances and ship parts ready for assembly by the customer.

We invite manufacturers to consider the advantages in cost savings and product improvement by the use of Michigan tubing.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

THE OLDEST NAME IN ELECTRIC RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.

More than 35 Years in the Business
9450 BUFFALO STREET • DETROIT 12, MICHIGAN
FACTORIES: DETROIT, MICHIGAN—SHELBY, OHIO

DISTRIBUTORS: Steel Sales Corp., Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland Co., Dayton, Ohio—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—Strong, Carlisle and Hammond Co., Cleveland, Ohio—Globe Supply Co., Denver, Colorado—W. A. McMichaels Co., Upper Darby, Pa.—A. J. Fitzgibbons Co., Buffalo, N. Y.—Harry E. Clark & Co., Houston, Texas—J. B. Beaird Co., Inc., Shreveport, La.—C. I. Crois Co., Birmingham, Alabama.

ALUMINUM is *Why*

pilots can feed more "juice" to their jets

When a jet pilot's life hinges on a momentary burst of extra power, he pumps a stream of raw fuel into the afterburner of his engine. A vital component of the pump is an impeller, running at speeds up to 32,000 RPM.,

Designers were eager to use aluminum as a weight-saving measure. But they also had to consider the problems of corrosion and erosion—caused by high operating temperatures—which rapidly destroyed the critical dimensions of certain surfaces.

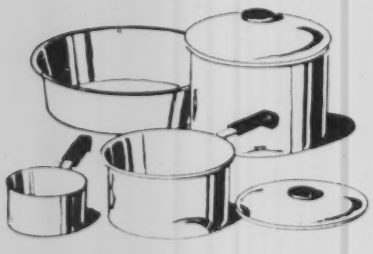
The answer came in a strong, lightweight casting of 356-T6 aluminum alloy, finished with a hard anodic coating so tough that it defies corrosion, erosion and wear.

ALCOA is *How*

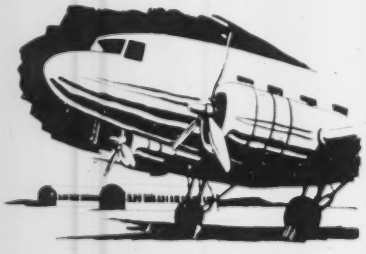
Alcoa engineers, consulted by the Accessories Division of Thompson Products, Inc., on the afterburner impeller problem, came up with the answer in Hard Coat Alumilite #726, a product of Alcoa pioneering in research and development. You can utilize this same technique to get the hard, wear-resistant coating that makes it possible to replace heavier metals with aluminum. Or you can draw on Alcoa's experience with more than 30 other finishing methods to meet the requirements of your product. For complete and authoritative data, call your local Alcoa sales office, or write: Aluminum Company of America, 877-L Alcoa Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum

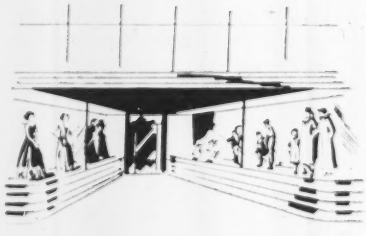
ALUMINUM COMPANY OF AMERICA



POLISHING gives aluminum cooking utensils their brilliant luster to add eye-appeal and provide a surface that's easy to clean because it has no pits or rough spots to trap food particles.



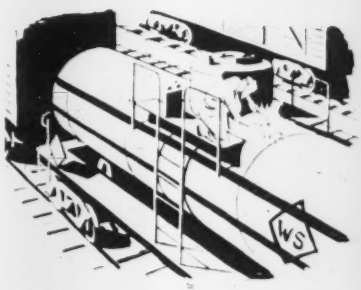
ALCLAD PRODUCTS, made by bonding pure aluminum or a special alloy to a base of aluminum or aluminum alloy, demonstrate remarkable resistance to corrosion and are widely used in aircraft.



ALUMILITE† FINISHES on store fronts and entrances are economical to maintain, do not stain adjoining surfaces and harmonize with modern architectural designs.

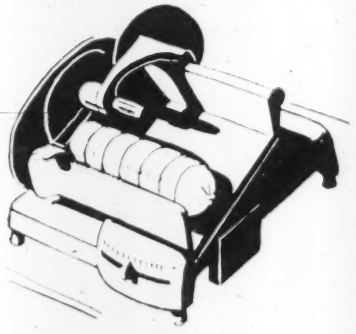
†Trade Name of Aluminum Company of America.

***ALMOST ANY SHAPE** can be produced as an Alcoa® Aluminum Extrusion—hollow, semi-hollow, solid. Extrusions put the metal where it's most needed, yet use less metal than rolling or fabricating by welding or riveting.

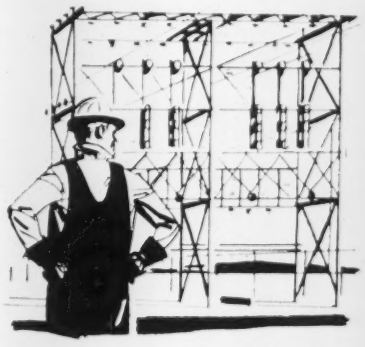


LARGE STRUCTURES are usually arc-welded, but aluminum assemblies also can be joined by torch welding, all three resistance-welding processes—spot, seam or flash, and brazing.

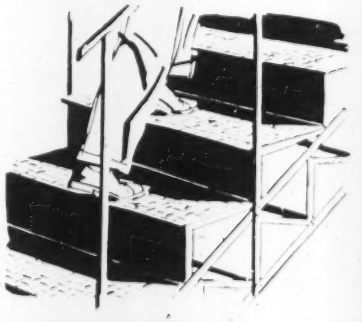
Products marked* are available from your local Alcoa Distributor listed here



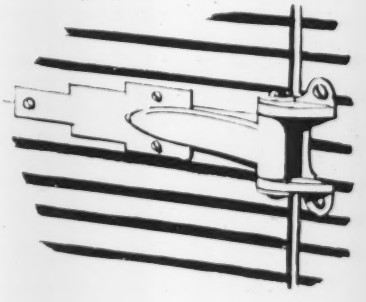
CASTINGS—Aluminum standard permanent mold castings, like parts for this meat slicer, are strong and sound when Alcoa makes them. They compete in price with castings of any metal when you figure their cost machined, finished and completely assembled.



***SUBSTATIONS** built of lightweight Alcoa Aluminum Structural Rolled Shapes are quickly fabricated and erected. Aluminum's corrosion resistance eliminates current shutdowns for maintenance painting.



***TREAD PLATE**—Strong Alcoa Aluminum Tread Plate is widely used in refineries and chemical plants because it is nonsparking—in trucks and tractors because it is lightweight.



ALCOA ALUMINUM FORGINGS meet the need in products that must be light in weight, high in strength. Alcoa forge shops are ready with expanded facilities and new production methods.

ALABAMA
Birmingham
Hinkle Supply Co.

CALIFORNIA
Los Angeles
Ducommun Metals & Supply Co.
Pacific Metals Co., Ltd.
San Francisco
Pacific Metals Co., Ltd.

COLORADO
Denver
Metal Goods Corp.

CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.

FLORIDA
Hialeah
Florida Metals, Inc.
Jacksonville
Florida Metals, Inc.
Tampa
Florida Metals, Inc.

GEORGIA
Atlanta
J. M. Tull Metal & Supply Co., Inc.

ILLINOIS
Chicago
Central Steel & Wire Co.
Steel Sales Corp.

INDIANA
Indianapolis
Steel Sales Company of Indiana, Inc.

LOUISIANA
New Orleans
Metal Goods Corp.

MARYLAND
Baltimore
Whitehead Metal Products Co., Inc.

MASSACHUSETTS
Boston
Edgcomb Steel of New England, Inc.
Cambridge
Whitehead Metal Products Co., Inc.

MICHIGAN
Detroit
Central Steel & Wire Co.
Steel Sales Corp.

MINNESOTA
Minneapolis
Steel Sales Co. of Minn.

MISSOURI
Kansas City
Metal Goods Corp.
St. Louis
Metal Goods Corp.

NEW JERSEY
Harrison
Whitehead Metal Products Co., Inc.

NEW YORK
Buffalo
Bruce-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.
New York
Whitehead Metal Products Co., Inc.
Rochester
Bruce-Mueller-Huntley, Inc.
Syracuse
Bruce-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.

NORTH CAROLINA
Charlotte
Edgcomb Steel Co.

OHIO
Cincinnati
Williams & Co., Inc.
Cleveland
Williams & Co., Inc.
Columbus
Williams & Co., Inc.
Toledo
Williams & Co., Inc.

OKLAHOMA
Tulsa
Metal Goods Corp.

OREGON
Portland
Pacific Metal Co.

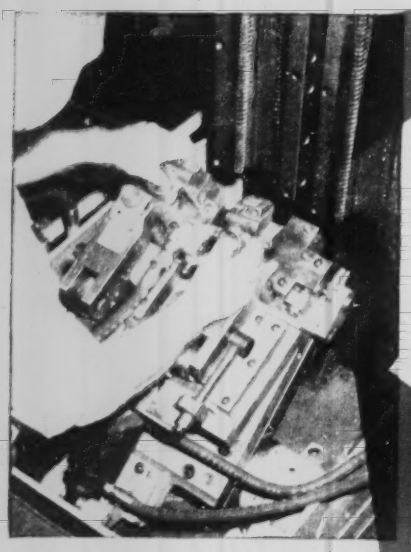
PENNSYLVANIA
Philadelphia
Edgcomb Steel Co.
Whitehead Metal Products Co., Inc.
Pittsburgh
Williams & Co., Inc.

TEXAS
Dallas
Metal Goods Corp.
Houston
Metal Goods Corp.

UTAH
Salt Lake City
Pacific Metals Co., Ltd.

WASHINGTON
Seattle
Pacific Metal Co.

WISCONSIN
Milwaukee
Central Steel and Wire Co.
Steel Sales Corp.



FIXTURE AUTOMATICALLY TILTS, CLAMPS PARTS for GENERATING TYPE BROACHING

Speeds production of parking brake brackets designed and built the **American** *way*

Two parallel surfaces on each of two parts are straddle broached in one pass on this American SB-12-10 single ram broaching machine. Over 350 of these intricate parking brake brackets are completed every hour.

The complete tooling designed the American Way features:

1. Generating type broaches.
2. Fully automatic work holding fixture with tilting table.
3. Automatic clamping and unclamping of parts.

The operator simply loads and unloads the parts, starting each machine cycle by push button control.

For the answer to your broaching problem send a part-print or sample and hourly requirements to American . . . the organization that gives you the extra advantages of experience in producing all three . . . broaches, machines and fixtures. No obligation. Address Dept. S.

For more information on the American SB-12-10 and other American machines, write for Circular 2500.

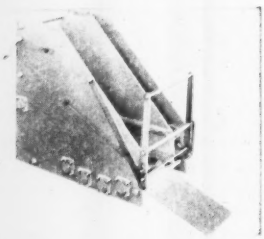
American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
American Building - Ann Arbor, Michigan

SUNDSTRAND

NEW PRODUCTS and equipment

in continuous operation, automatically shutting off when correct loop size is reached. Thus, material is fed from a slack loop rather than from the full weight of the coil.

Rate of feed is universal and is determined solely by the machine's



individual requirements without attention or adjustment.

To ease loading, the trip bar lifts to expose machine's throat completely. Three coil-cradle sizes are built for 10, 13 and 15-inch roll widths at 36-inch diameter. Benchmaster Mfg. Co., Dept. ST, 1835 W. Rosecrans Ave., Gardena, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Helical Carbide End Mills

. . . finishes of 20 rms

Excellent production rates and finishes of 20 rms and better are reported on this line of helical

carbide end mills. In tests on 4130 heat-treated steel, these cutters are reported to remove 23.6 cu in. of metal per minute on a 20 hp milling machine.

Due to the high helix angles used, mills are designed to cut with a shearing action. Mills are available in six standard sizes from 1½ to 4 inches in diameter for

eliminate the guesswork in selecting tool steels

Thousands of metal working people are using the Crucible Tool Steel Selector to determine exactly which type of steel they need. This handy selector covers 22 tool steels which fit 98% of all tool steel applications.

The selector is unique because it starts with the ultimate use of the steel. It breaks down all tool steel applications into six major classifications, under which the different grades of steel available for certain specific requirements are indicated in legible cutouts. Heat treatment and machinability data are also included for each grade.

A flip of the dial will give you the answer, and almost just as quickly you can get the steel you select. For each type of steel shown on the selector is in stock in Crucible warehouses, conveniently located throughout the country.

To get your Selector merely fill in the coupon and mail. There is no obligation whatsoever.

⅓ actual size, Selector is in 3 colors

HERE'S AN EXAMPLE:

Application – Deep drawing die for steel

Major Class – Metal Forming – Cold

Sub-Group – Special Purpose

Tool Characteristics – Wear Resistance

Tool Steel – Airdi 150

A turn of the dial does it! And you're sure you're right

Crucible Steel Company of America
Dept. S, Chrysler Building,
New York 17, N. Y.

Name _____

Company _____ Title _____

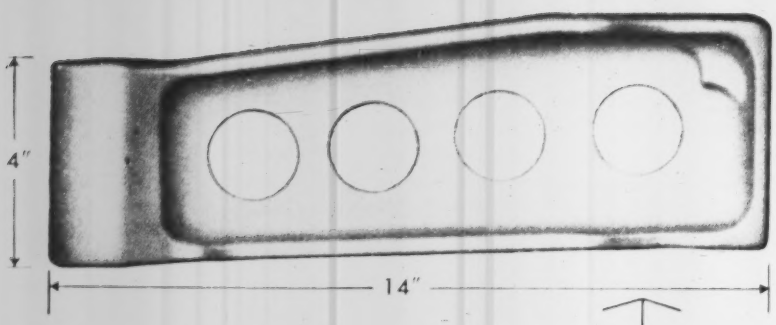
Address _____ City _____ State _____

CRUCIBLE first name in special purpose steels

53 years of Fine steelmaking

TOOL STEELS

CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.



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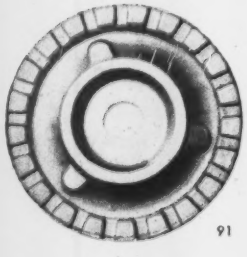
to Gas Range Burners

MUELLER BRASS CO.

Aluminum Forgings Save Weight, Save Finishing Time and Provide the Same Strength as Steel

If weight and strength are important factors in your product, then Mueller Brass Co. forged aluminum parts may be your best bet. Mueller aluminum forgings weigh only ⅓ as much as steel, yet they are approximately as strong. They make ideal parts for many applications and they are particularly desirable as parts for high speed rotating and oscillating machines because they reduce vibration and bearing loads, thus causing less wear on other parts. They possess good dimensional stability and retain their mechanical properties at high speeds and reasonable temperatures. The smooth, bright surfaces save machining time and eliminate costly finishing. Mueller Brass Co. can forge aluminum parts to your specifications in any practical size and shape from any of the standard or special alloys. Write us today for complete information.



MUELLER BRASS CO.
PORT HURON 19, MICHIGAN

91

NEW PRODUCTS and equipment

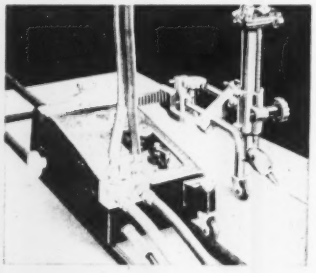
steel and nonferrous cutting. Sonnet Tool & Mfg. Co., Dept. ST, 576 N. Prairie Ave., Hawthorne, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 16

Gas Cutting Torch

. . . accurate bevels on plate

Floating torch assembly permits uniform accurate bevel cutting regardless of humps, bows or other uneven surfaces in steel plate. Assembly has two principal parts



Guide wheel and bevelling torch. The former controls distance between torch tip and plate, automatically raising or lowering torch to compensate for unevenness.

Torch swivel head permits tip to be rotated to cut whatever angle of bevel is required. The Cut-O-Matic unit to which the torch is attached is a motor-driven cutting machine weighing less than 50 pounds. National Cylinder Gas Co., Dept. ST, 840 N. Michigan Ave., Chicago 11, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 17

Metal Washing Meter

. . . no wiring or piping

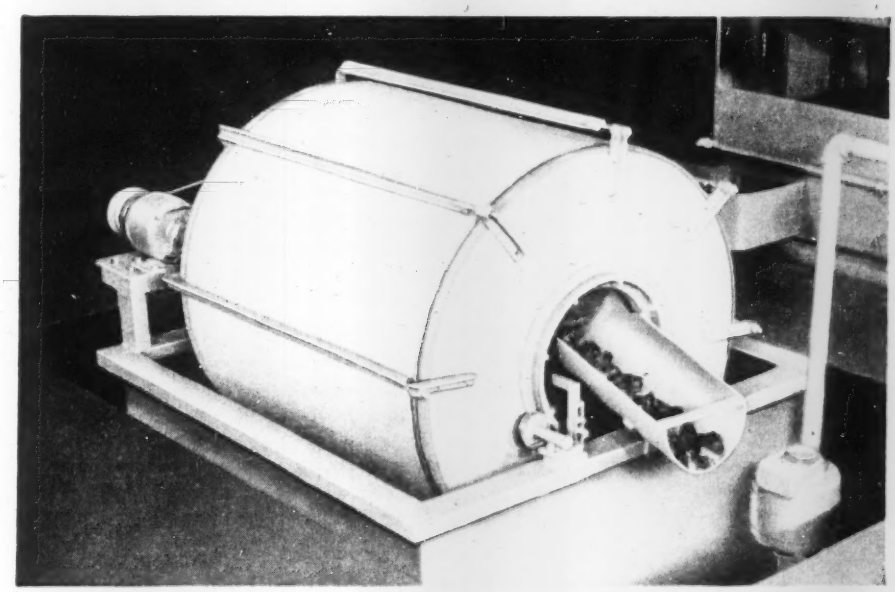
This meter shows at a glance that right amount—or too much or too little—of compound is being used in the metalwashing operation. The Econometer control instrument is not wired into or piped into the machine. It is ready to work instantly as soon as plugged into any light socket.

Function is to prevent waste of compound or failure to clean. It gives the operator a continuous check on how his washing job is being done. Not a compound feeder, it tells when to feed instead. DuBois Co. Inc., Dept. ST, 1120-1140 W. Front St., Cincinnati 3, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 18

The MURRAY WAY INDUSTRIAL FILTER

A Revolutionary Development in Solution Reclamation That Gives You These Money-Saving Features!



- **AUTOMATICALLY OPERATED**
- **SELF-CLEANING**
- **ECONOMICAL**
- **COMPACT**
- **ADAPTABLE**

The Murray-Way Industrial Filter automatically rotates fresh filtering area into position while simultaneously ejecting the contaminant.

With this new unit costly consumption of throw-away filtering media is eliminated since the wire filtering screen has many times the life of cloth filtering webs.

The Murray-Way Industrial Filter is a compact unit. It offers unusually great filtering capacity in proportion to area occupied.

Amazingly adaptable, the Murray-Way Filter may be used with an individual machine unit or as a central filtering station for many units. Capacity of filtration may be easily increased by adding filters in tandem—separately or in the same tank, to meet requirements. A selection of filtering screen material and size of screen opening can be supplied in monel, stainless steel, brass or bronze to fit your requirements.

For technical details of operation—write for Bulletin F-5301.

MURRAY WAY

THE MURRAY-WAY CORPORATION

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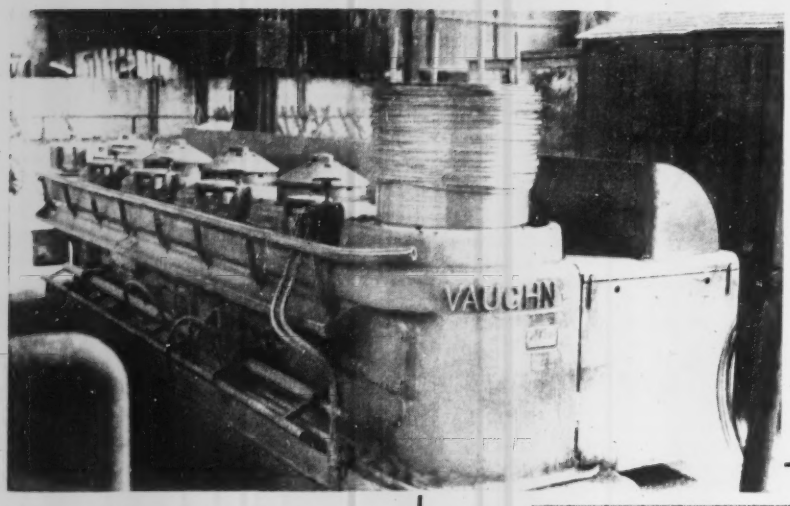
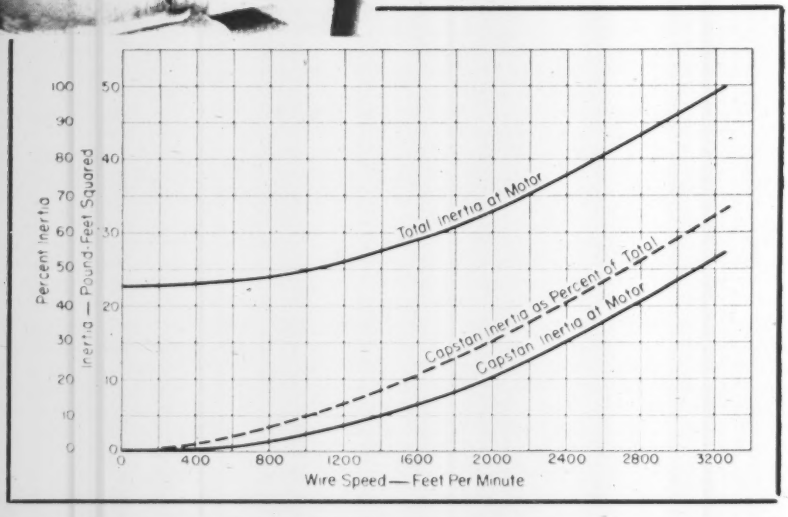
AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT



Increase in speed can be traced largely to tandem machines like one above. But, as curve shows, inertia becomes more troublesome at high speeds



Wire Drawing...

HIGHER SPEEDS, GREATER PROBLEMS

Boosting drawing speeds from 400 to 2000 fpm and even more in relatively few years was an economic "must." It taxed the best brains in wire and electrical industries

By J. RAYMOND ERBE
Industry Engineering
Westinghouse Electric Corp.
East Pittsburgh

MODERN mills draw wire at speeds that were considered impossible a few years ago—this despite much more rigid requirements in strength and finish. Especially true in the case of various grades of steel wire, these high speeds are due to the development of better steels and improved wire-drawing machinery and associated processes and techniques.

Long rows of single hole blocks all being driven from a line shaft through bevel gears and a mechanical clutch was a typical arrangement a few years back. Wire-drawing speed was determined by the maximum speed at which the gears could run while the clutch was engaged without tearing the clutch apart, jerking the tongs off the wire, or breaking the point on the wire.

Speed Quintupled — Where the drawing speed on these machines was usually 300 to 400 fpm the same wire is now drawn at 1500 to 2000 fpm and, in several cases, even higher speeds are used. Mostly, these speeds are obtained by use of the tandem (multiple block) machine on which each block is driven by its own motor.

As most wire drawing machines have frequent starting and stopping, smooth acceleration and deceleration is desirable. Frequently some range of speed control is needed, too. To meet these conditions best an adjustable speed direct-current motor is used.

Flange-mounted Motors—When drawing some materials, a wet process is used. In these cases, the driving motor is mounted external to the machine to protect it from leakage or condensation due to the cooling and lubricating fluid. This is usually accomplished by flange-mounting the motor. On tandem machines using a dry process for intermediate and heavier wire sizes, the motors are generally flange mounted, too.

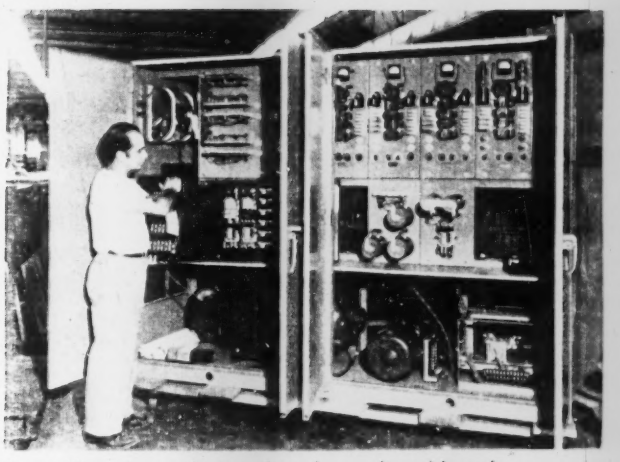
Flange mounting is desirable from the user's standpoint because drive is integral with the machine and greatly simplifies its installation. However it imposes several problems on the motor designer, since entire motor weight is overhung from one end. Armature must be well balanced or serious vibration will result which can affect the finish of the wire, increase the mechanical maintenance of the machine and, in extreme cases, seriously damage the motor itself.

Bigger Motors—Because higher drawing speeds require more horsepower, size of the motor is increased, which also increases its inertia. Motors on tandem machines must operate in parallel and with their speed regulations sufficiently matched to prevent breaking the wire between any of the blocks. However, due to variations in the wire, and difference in drafting or reduction taken between blocks, individual motors generally do not operate at the same speed and load, and hence must have their inherent regulation corrected by the control.

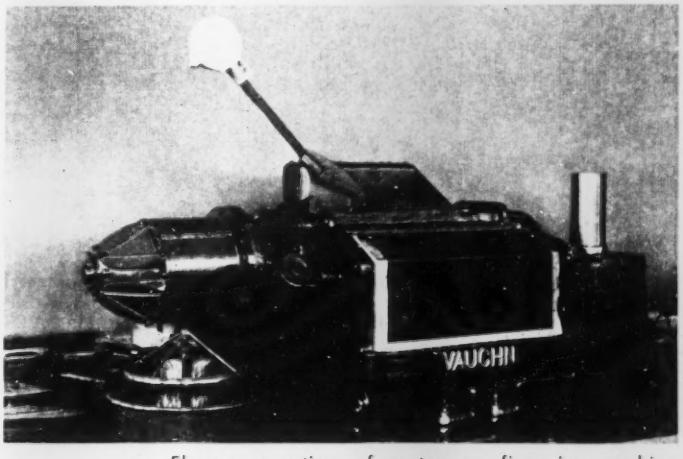
Time required for a motor to change from one speed to another is directly related to its inertia—increased inertia increases the time needed to change the motor speed. Because increased diameter increases the inertia it may seem that a solution is to obtain increased horsepower by increasing the armature length. But this increases the overhung length, and adversely affects the balance. Consequently, motors for this application are designed for the lowest inertia that is consistent with good balance.

Gear Ratio—Another factor that affects the operation of a tandem machine adversely is the reduced gear ratio between the motor and its block which results from an increased drawing speed. Diameter of the block remains essentially constant, for any given machine, primarily to maintain reasonable space limits.

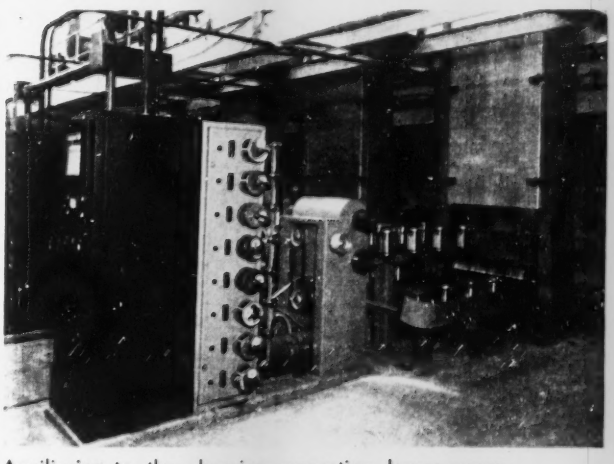
Since it is not desirable to build motors for operation above certain speeds because of commutation, maintenance, and safety, the only way in which increased drawing speed can be obtained is by reducing the gear ratio. This effect is



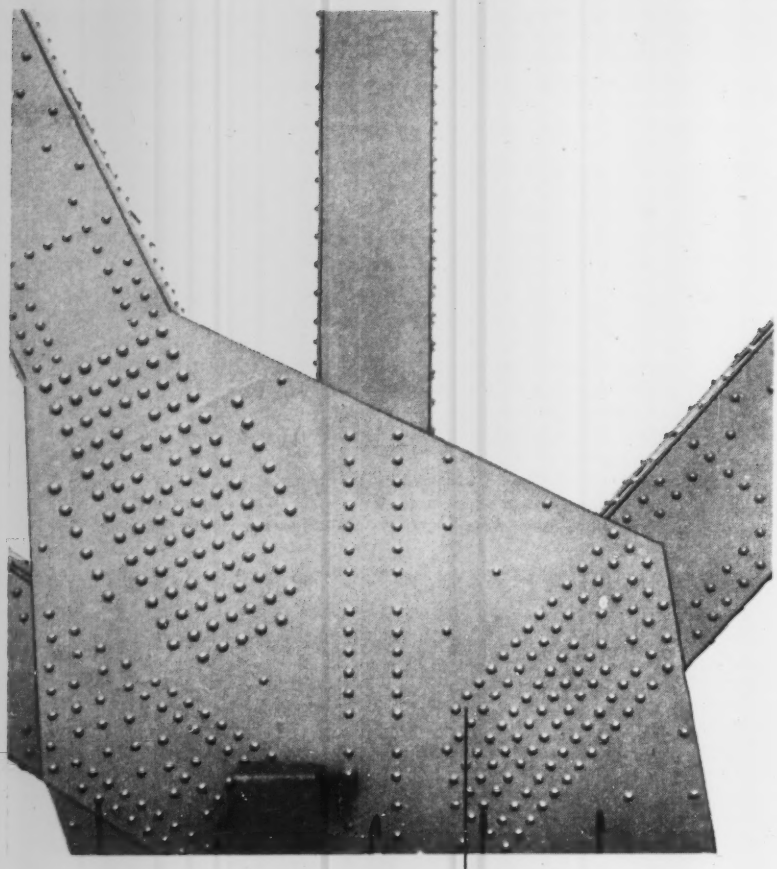
Some idea of complexity of modern adjustable voltage control is evident here. Despite appearances, units are rugged and maintenance is simplified



Flange mounting of motor on fine-wire machine protects it from leakage or condensation due to cooling or lubricating fluids. Even on dry tandem machines, motors are usually flange-mounted



Auxiliaries to the drawing operation have experienced the same speedup. Complete drive for enameling soft drawn copper wire provides spooler motors for each of eight strands being coated



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illustrated in the graph (p. 158). The result of these special requirements is the development of a motor that has low inertia and special fields.

It is dynamically balanced, has armature coils protected by mica insulation in the slot portions, field coils with mica insulation and glass tape, and both armature and field coils impregnated with thermoset varnish. Double width inner race ball bearings are used to provide greater contact area and liberal space for grease.

Controls Vary—Most fine wire machines and certain types of the larger machines, such as single block machines, require rather simple controls and need not be discussed. Tandem-type machines having individual block motors present special problems.

Because of variations between different grades of wire, and since most users cannot afford to have sufficient machines to assign one or more to a different grade exclusively, the delivery speed range, normally 2 to 1, must accommodate these variations. This is usually obtained by motor field control, but in cases where greater speed range is required it is obtained by adjustable voltage control or a combination of the two. Most of the problems are equally applicable to both methods of control.

Tandem Machines — Motors on tandem-block machines must all start and accelerate at the same rate to control the amount of loop between the blocks to avoid breakage. In the case of the constant voltage control, acceleration is accomplished by using armature accelerating contactors to apply the armature voltage in steps.

When loading on several motors is relatively uniform, and a sufficient number of accelerating steps are used, this type of control functions satisfactorily. As a result, a large percentage of the machines of this type uses this method of control. Where appreciable difference in loading occurs—due to poor drafting between the blocks, non-uniform die wear, wide variation in grades being drawn, or some other cause—non-uniform acceleration results.

Must Compensate — To prevent breakage, the dancer arm rheo-

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Whatever the job or working conditions, Century's wide line of types, sizes, and variety of operating characteristics, enables you to select the motor specifications for top equipment performance.

⅛ to 400 horsepower ratings — A.C. or D.C. — Furnished in Drip Proof — Splash Proof — Dust Proof — or Explosion Proof frames — for most all atmospheric surroundings.

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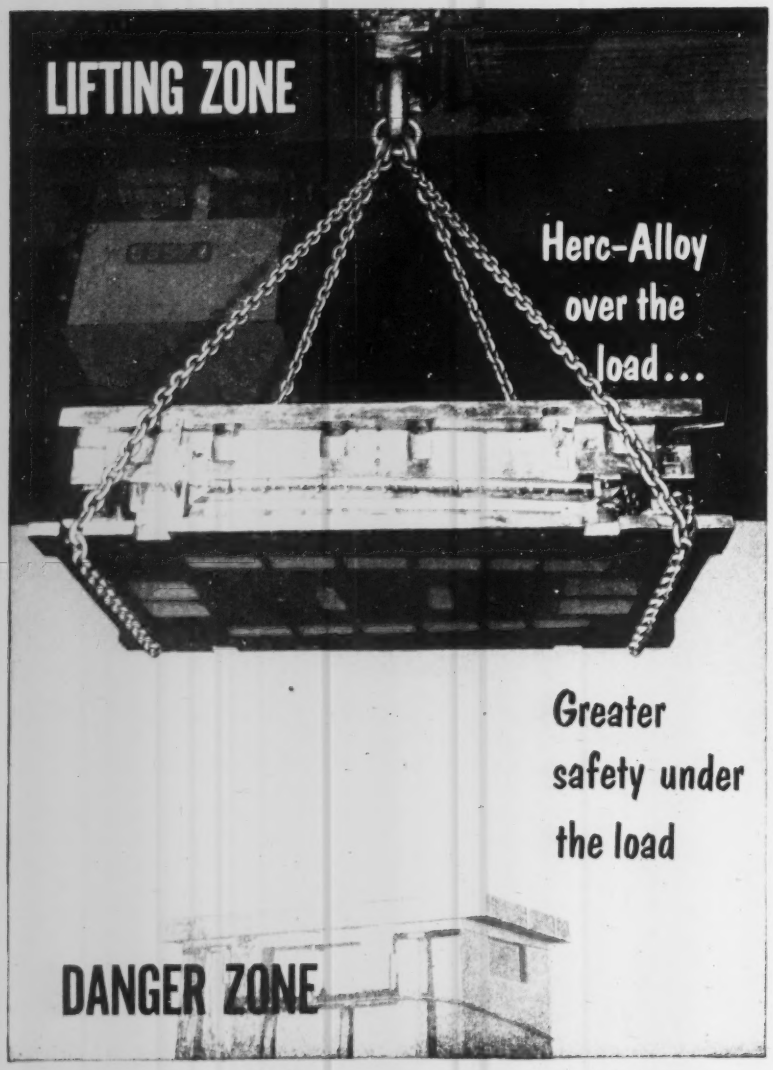
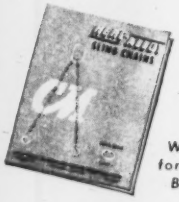
Offices and Stock Points in Principal Cities



SPECIFY

HERC-ALLOY

SLING CHAINS



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Herc-Alloy Sling Chains bring you many advantages. First and foremost...they offer maximum protection to men and materials. Secondly, their special alloy steel, processed by men with unmatched heat treatment know-how, gives long life and economy. Third, they weigh less (without any sacrifice in tensile strength) and are far easier for workmen to handle. That's why so many well-known plants are switching to Herc-Alloy Sling Chains.

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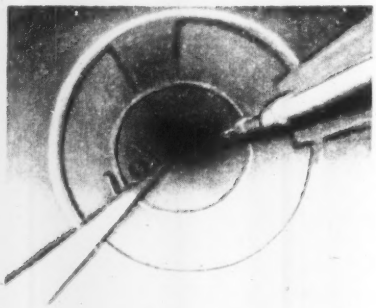
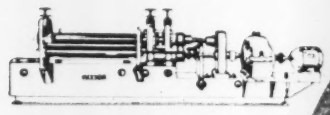


stats must compensate for these differences by controlling the motor fields. Where constant voltage control is used, this means that the motors must have a speed range of at least 3 to 1 by field control. An inherent characteristic of motors is that the wider their speed range by field control the poorer their stability.

Because of physical limitations, the loop between the blocks is small, which results in less and less time available for motor speed correction as the wire speeds are increased. Consequently, on higher speed machines, applying the armature voltage in steps and compensating the error in motor speeds by field control, in combination with the other factors mentioned, ofttimes results in serious hunting or surging of the motors. This, of course, makes the machine extremely difficult to operate.

Much of this difficulty is eliminated through the use of adjustable voltage control because the

PAXSON GIVES YOU THE EDGE



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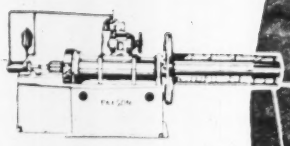

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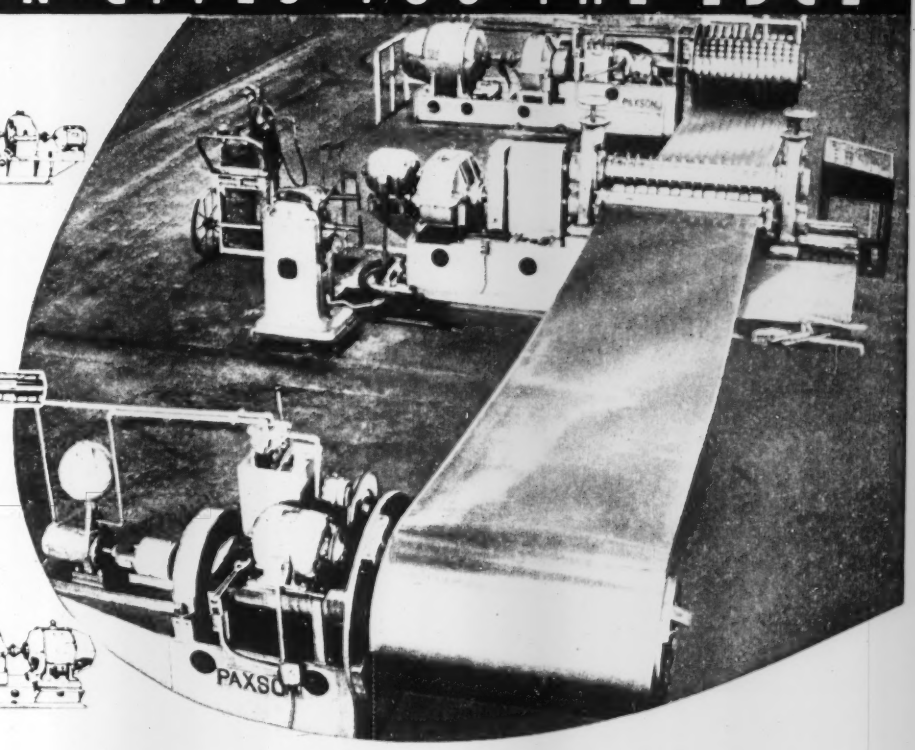
COILERS



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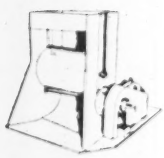
Slitting Needs



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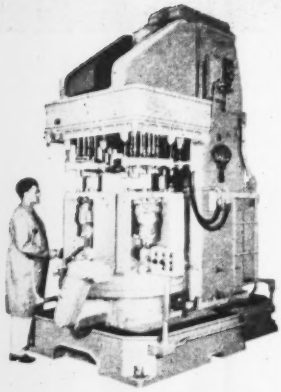
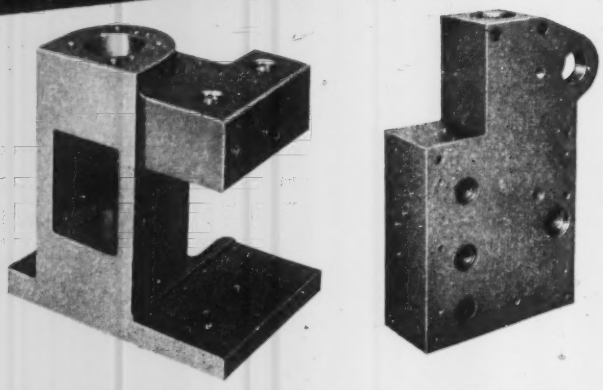
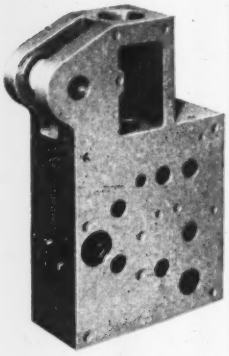


NATCO—C4A Multiple Drilling, Boring, Facing and Tapping Machine





Views of Control Panel Valve Bodies, Pressures Up to 1500 p.s.i.

PRESSURE TIGHTNESS, of course, requires DENSITY,—and density can be achieved only by close control of each and every step in casting manufacture;—from charging floor to shipping platform. Meehanite foundries have long been noted for the QUALITY of their product, a result of their use of Meehanite process controls;—controls which result in uniform—dense—better property castings.

PROOF of this is found in the important applications of Meehanite castings made by the National Automatic Tool Co., Inc., Richmond, Indiana, in hydraulic control valve bodies. These units are the heart of the operating mechanism of their line of NATCO Drilling, Boring, Facing and Tapping Machines. The castings and the machine tool are illustrated.

Write for Bulletin #10—Meehanite, The Metal For Pressure Castings. It may give you an idea that will lead to the solution of one of your problems.

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E. W. Bliss Co.	Hastings, Mich. and Toledo, O.
Builders Iron Foundry	Providence, Rhode Island
Compton Foundry	Compton, Calif.
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The Henry Perkins Co.	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc.	Buffalo, New York
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Rosedale Foundry & Machine Co.	Pittsburgh, Pennsylvania
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Shenango-Penn Mold Co.	Dover, Ohio
Sonith Industries, Inc.	Indianapolis, Ind.
Standard Foundry Co.	Worcester, Massachusetts
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motor speed range by field control is less, resulting in more stable motors, and because the armature voltage is smoothly applied by generator field control instead of in steps.

Associated Problems—The drive for some enameling towers for soft drawn copper wire ranging from No. 18 to No. 32 gage is typical of associated problems in wire processing. In the complete drive, the capstan pulls individual strands off the payoff spools, through the coating bath and the drying oven. Individual spooler drives are provided for each strand being coated.

Due to the wire size, spooler tension must be maintained within relatively close limits to prevent broken wire over the entire spool build-up. In addition, smooth acceleration and deceleration are necessary as well as a wide range of wire speed to reduce the amount of scrap during the furnace warm-up and cooling-off periods. An adjustable voltage drive is used to obtain successful operation of these towers.

Fabricating Iron Powder Parts

A 28-page booklet released by Plastic Metals Division, National Radiator Co., Johnstown, Pa., presents production facts about mechanical parts fabricated from electrolytic iron powder by National Cash Register Co.

Curves showing elongation, as well as tensile, yield and impact strengths show that parts made from this powder can have higher strength than those of sheet or bar stock, and operating results show adherence to close dimensional tolerances with substantial cost savings.

Plastic Pipe Booklet

Republic Steel Corp. reports completion of a catalog on its newest product, plastic pipe. This 12-page booklet tells why Republic entered the plastic pipe field, describes the two principal types of pipe made, shows how to join plastic pipe, and lists various engineering and corrosion data.

Copies are available without charge from the Advertising Division, 3100 E. 45th St., Cleveland 27.

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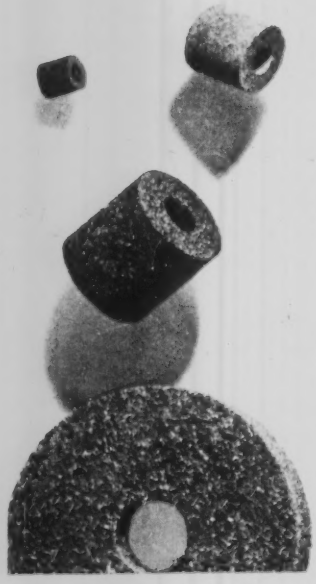

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CALENDAR
OF MEETINGS

November 17, Armour Research Foundation, Illinois Institute of Technology; and Trade Association Executives Forum of Chicago: Trade association technical conference, Technology Center, Chicago. Information: Illinois Institute of Technology, 35 W. 33rd St., Chicago 16.

November 17-19, Pittsburgh Business Show: Hotel William Penn, Pittsburgh. Information: R. I. Pontius, Steel City Electric Co., 1297 Columbus Ave., Pittsburgh 33.

November 18-19, National Metal Trades Association: Fall meeting, Hotel Statler, Cleveland. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Charles I. Blatchford.

November 18-20, American Institute of Electrical Engineers: Joint AIEE-IRE conference on electronic instrumentation in nucleonics and medicine, Hotel New Yorker, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Herline.

November 18-20, Institute on Tool Engineering: University of Wisconsin, Madison, Wis. Information: George R. Sell, Student Offices, University of Wisconsin, Madison 6, Wis.

November 19, Anti-Friction Bearing Manufacturers Association Inc.: Fall meeting, The Cloister, Sea Island, Ga. Association address: 60 E. 42nd St., New York 17. Secretary: H. O. Smith.

November 19-20, National Association of Corrosion Engineers, Western Region: Annual conference, Hotel Biltmore, Los Angeles. Association address: 1061 M & M Bldg., Houston 2. Executive secretary: A. B. Campbell.

November 20, Association of American Railroads: Annual meeting, Blackstone hotel, Chicago. Association address: Transportation Bldg., Washington 6. Secretary: G. M. Campbell.

November 29-December 4, American Society of Mechanical Engineers: Annual meeting, Hotels Statler, McAlpin, Governor Clinton, New York. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

November 30-December 1, American Management Association: Special supervisory conference, Palmer House, Chicago. Association address: 330 W. 42nd St., New York 36. President: Lawrence A. Appley.

November 30-December 3, American Institute of Steel Construction Inc.: Annual convention, Boca Raton hotel and club, Boca Raton, Fla. Institute address: 101 Park Ave., New York 17. Secretary: M. Harvey Smedley.

November 30-Dec. 5, Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: Charles F. Roth, 24th Exposition of Chemical Industries, 480 Lexington Ave., New York.

December 1, Spring Manufacturers Association: Annual meeting, Biltmore hotel, New York. Association address: 249 Main St., Bristol, Conn. Secretary: George E. Underwood.

December 2-4, American Institute of Mining & Metallurgical Engineers: Annual electric furnace steel conference, Netherland Plaza hotel, Cincinnati. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

December 2-4, Society for Experimental Stress Analysis: Annual meeting, Hotel McAlpin, New York. Society address: P.O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

December 3, American Iron & Steel Institute: Philadelphia regional technical meeting, Warwick hotel, Philadelphia. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

December 3-4, Society of the Plastics Industry Inc.: Film, sheeting and coated fabrics division conference, Hotel Commodore, New York. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

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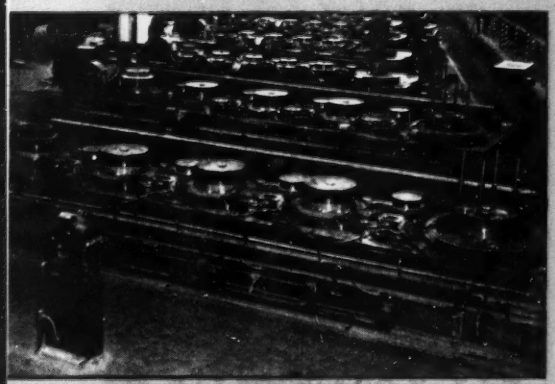

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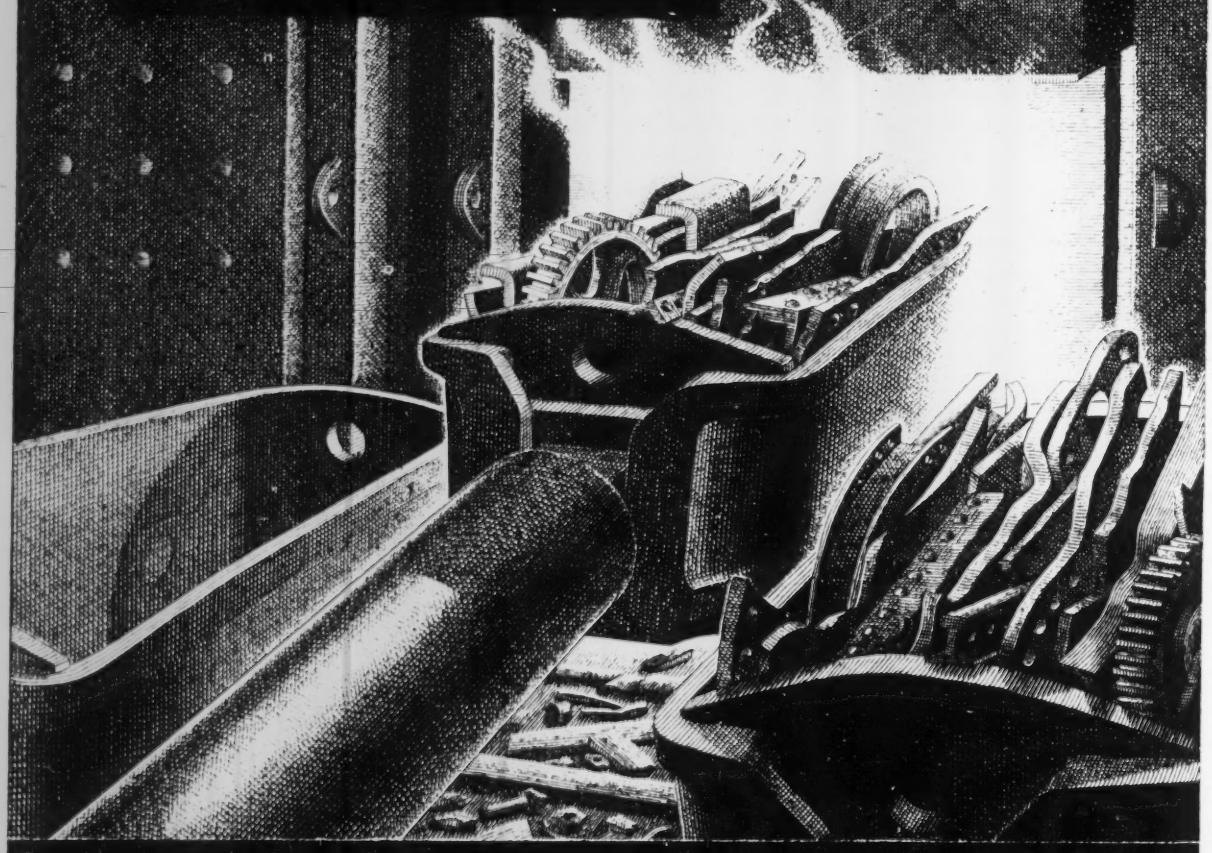

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Market Outlook

STEEL PRODUCTION declined for the third consecutive week and touched the lowest mark recorded this year for a strike-free week.

The latest decline put production of steel for ingots and castings down to 92.5 per cent of capacity in the week ended Nov. 14. This is a 1-point recession from the preceding week. The one other week that was lower this year was in September when one steel producing area was afflicted with a strike.

STILL GOOD—Even after the latest decline, the week's production for steel ingots and castings totals 2,085,375 net tons. A little less than three years ago, such a tonnage figure was considered a real accomplishment. It was not until the beginning of February, 1951, that weekly production ever exceeded the 2-million-ton level.

ADJUSTMENT—While steel production is declining moderately, it was expected to do so at this time. In fact, there had been predictions that the decline would be even sharper than it is. Even though the biggest consumer of steel —the automobile industry— expects its output in November to be approximately 25 per cent below the October production, the major producers of steel are not alarmed by the reduced rate of steel buying. They look at the situation this way: "We think we've seen the worst of the declines in sales. Purchases are now the result of definite studies by users of their needs, rather than wild purchasing to inflate stocks."

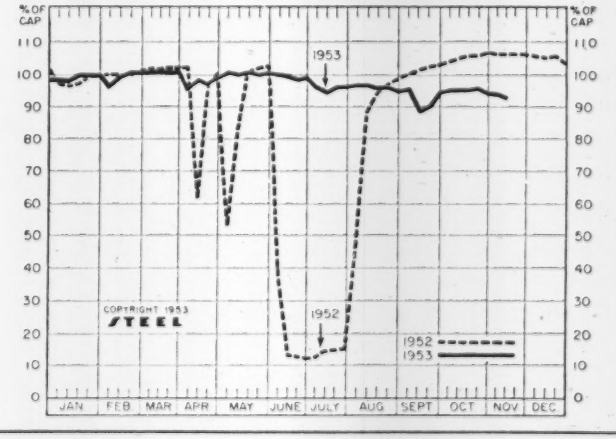
OPTIMISTIC— Sustained good business until the first of April is foreseen by Walter S. Doxsey, president, American Steel Warehouse Association. He estimates that warehouse sales in 1954 will fall not more than 10 per cent under current high levels. However, Mr. Doxsey warns that competitive conditions will no longer permit warehouses (suppliers of steel to small users) to enjoy orders for mill-size quantities which have accounted for as much as 5 per cent of their total tonnage during the last two or three years.

BETTER FOR THE CUSTOMER— Warehouses are in an increasingly improved position to serve their customers. Inventories on most forms of steel have been pretty well built up. An exception is wide flange structural shapes. They are in short supply and are expected to remain that way for some time (see p. 181). Some warehouses now notice that customers place prices above availability of steel.

"UNDER CONSTRUCTION"—While wide flange structurals are in tight supply, the available tonnage of standard structurals is increasing. Many structural fabricating shops have enough work on hand to keep them busy the rest of this year. Absorbing considerable tonnages are bridges and school buildings. Prospects are that first-quarter structural business will hold up well, even exceeding some previous estimates. That good level of construction has been a boon also to producers of reinforcing steel.

GOING AFTER BUSINESS—While demand for cold-rolled carbon steel sheets is down it is better than some people thought it would be. However, the reduced requirements of the automotive industry have prompted a Detroit steel producer to seek business in the East and meet competition there by absorbing $12 to $13 a ton in freight, as well as a differential in the base price.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Nov. 14	Change	Same Week 1952	Same Week 1951
Pittsburgh	91	— 2*	103	102
Chicago	98.5	— 2*	111.5	106
Mid-Atlantic	94	— 2	99	101
Youngstown	96	— 1	106	106
Wheeling	99	+ 1	100.5	99
Cleveland	98.5	— 2*	114.5	99
Buffalo	106.5	0	106.5	104
Birmingham	96.5	0	105.5	50
New England	85	+ 5	88	90
Cincinnati	68	+ 1	94	103
St. Louis	80	— 0.5	98	88.5
Detroit	97.5	0	106	104
Western	100	— 4	104	102
Estimated National Rate	92.5	— 1	106	101

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,459 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Nov. 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.675	Strip, C.R., stainless, 430 (lb)	$0.415
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	5.013
Tie Plates	5.125	Bars, H.R., carbon	4.850	Pipe, black, buttweld (100 ft)	14.454
Axles, railway	7.250	Bars, reinforcing	4.775	Pipe, galv., buttweld (100 ft)	17.731
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.860	Pipe, line (100 ft)	141.960
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516
Structural Shapes	4.383	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.904	Tubing, mechanical, carbon (100 ft)	‡
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.135	Sheets, galvanized	6.945	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, tool steel, H.R. alloy, high speed W 18, Cr 4, V 1 (lb)	1.730	Sheets, C.R., stainless, 302 (lb)	0.548	Tin plate, hot-dipped, 1.25 lb	$8.433
		Sheets, electrical	9.183	Tin plate, electrolytic, 0.25 lb	7.133
		Strip, C.R., carbon	7.286	Black plate, can making quality	6.233
				Wire, drawn, carbon	7.713
				Wire, drawn, stainless, 430 (lb)	0.545
				Bale ties (bundle)	5.653
				Nails, wire, 8d common	7.488
				Wire, barbed (80-rod spool)	6.847
				Woven wire fence (20-rod roll)	16.174

‡Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 10 1953	Nov. 3 1953	Month Ago	Oct. Average
(1947-1949=100)	141.5	141.5	141.5	141.5

STEEL's FINISHED STEEL PRICE INDEX

	Nov. 12 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.38	189.38	189.38	181.31	151.86
Index in cents per lb.	5.130	5.130	5.130	4.912	4.114

STEEL'S ARITHMETICAL PRICE COMPOSITE*

	Nov. 12 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$115.18	$115.18	$115.54	$110.98	$95.05
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	55.04	46.69
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	46.29
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.41
Steelmaking Scrap, GT	35.33	35.00	32.50	43.00	43.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 12 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.79
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.275
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.48
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.35	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	3.975-4.425	3.975-4.425	3.975-4.425	3.75-4.225	3.50
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45-5.95	5.45-5.95	5.45-5.95	5.10-5.80	4.00
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.475-5.525	5.475-5.525	5.475-5.525	5.10-5.225	4.325
Nails, Wire, Pittsburgh	6.35-6.55	6.35-6.55	6.35-6.55	6.20-6.35	5.775
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, ½-⅝", Pitts.	4.525	4.525	4.525	4.325	3.775

PIG IRON, Gross Ton	Nov. 12 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld. Phila.	60.75	60.75	60.75	59.25	50.17
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, deld. Phila.	61.25	61.25	61.25	59.75	50.67
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.09
Malleable, Valley	56.50	56.50	56.50	55.00	46.50
Malleable, Chicago	56.50	56.50	56.50	55.00	46.50
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	228.00*	163.00*

*78-82% Mn, per gross ton, Etna, Pa. †74-76% Mn, per net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$37.50	$36.50	$36.50	$44.00	$42.75
No. 1 Heavy Melt, E. Pa.	35.00	35.00	31.50	41.50	45.25
No. 1 Heavy Melt, Chicago	33.50	33.50	29.50	42.50	41.75
No. 1 Heavy Melt, Valley	35.50	35.50	34.50	44.00	42.75
No. 1 Heavy Melt, Cleve.	33.50	33.50	31.50	43.00	42.25
No. 1 Heavy Melt, Buffalo	34.50	34.50	33.50	43.00	48.50
Rails, Rerolling, Chicago	45.00	45.00	42.50	52.50	66.50
No. 1 Cast, Chicago	33.50	33.50	32.50	46.00	70.50

COKE, Net Ton					
Beehive, Furn, Connisvl.	$14.75	$14.75	$14.75	$14.75	$14.50
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	23.00	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 34.50, Lone Star brand, 35.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.50-30.00 deld. Conn. Valley, 29.625-30.125 deld. Midwest; Lake 30.125 deld; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 13.30, chemical 13.40, corroding 13.40, St. Louis, New York basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 45.00, 100 to 4999 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

DAILY NONFERROUS PRICE RECORD

	Price Nov. 12	Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1952 Avg.
Copper	29.50-30.00	Oct. 20	29.00-30.00	29.606	29.580	24.500
Lead	13.30	Sept. 16	13.80	13.300	13.540	13.965
Zinc	10.00	Sept. 11	10.50	10.000	10.180	12.500
Tin	82.50	Nov. 12	82.00	81.096	82.410	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 15	20.50	21.500	21.500	20.000
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+%, deld.; Magnesium, 99.8%, Freeport, Tex.

Mercury: Open market, spot, New York, $183-$185 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots, for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz. nom.

Palladium: $22-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $18-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $4.25-$4.75 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $42.45 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 82.50.

Titanium: Sponge, 99.3+%, $5 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $5.35 per lb f.o.b. shipping point; less than 1000 lb $5.50; 99+% hydrogen reduced, $6.30. Treated ingots $10.43.

Zinc: Prime western 10.00, brass special 10.25, intermediate 10.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 11.35, special high grade 11.50, die casting alloy ingot 14.50, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloys 21.00-22.00; No. 12 foundry alloy (No. 2 grade) 20.25-21.25; 5% silicon alloy, 0.60 Cu max., 23.00-24.00; 13 alloy, 0.60 Cu max., 23.00-24.00; 195 alloy 22.00-22.75; 108 alloy 21.00-21.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2 20.50-21.00; grade 3, 19.50-20.00; grade 4 17.50-18.50.

Brass Ingot: Red brass, No. 115, 24.50; tin bronze No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof 100,000 lb 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $18.50 per cwt; pipe, full coils $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 100,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

Sheets 23.00, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50, f.o.b. mill, 36,000 lb and over. Plates 19.50-22.25.

	NICKEL, "A" Nickel	MONEL, Monel	INCONEL, Inconel
Sheet, C.R. ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. widths or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000-lb and over.

Dia. or Across Flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 42.05-32.76, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 49.2 to 37.6 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 53.00, 20,000 lb or more 0.188-1.0 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 60.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow brass	41.72	41.66	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	21.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 13.00; low copper clippings 11.00, mixed clippings 10.00; old sheet 10.00; borings and turnings 6.50-7.00; pistons and struts 7.00; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 23.50; No. 2 copper 21.50; light copper 18.50-19.00; No. 1 composition red brass 16.75; No. 1 composition turnings 15.75-16.25; mixed brass turnings 11.00; new brass clippings 17.50; No. 1 brass rod turnings 12.50; light brass 10.00; heavy yellow brass 12.50; new brass rod ends 14.50-15.00; auto radiators, unsweated 12.50; cocks and faucets 14.50; brass pipe 16.00.

Lead: Heavy 10.00-10.50; battery plate 5.50-5.75; linotype and stereotype 12.00; electrotype 10.75; mixed babbitt 12.25.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 18.00-20.00; rods 24.00-26.00.

Nickel: Sheets and clips 70.00; rolled anodes 70.00; turnings 40.00; rod ends 70.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.50; new die cast scrap, 3.50; old die cast scrap, 3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S 3S clippings 15.00-15.50; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S, clippings 14.00-14.50; mixed clippings 13.75-14.25; old sheet 11.75-12.75; old cast 11.75-12.75; clean old cable, free of steel 15.00-15.50; borings and turnings 12.25-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 25.00; No. 2 copper 23.00; light copper 21.50; refinery brass (60% copper) per dry copper content 19.50; auto radiators 13.25 nom.

INGOT MAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 25.00; No. 2 copper 23.50; light copper 22.00; No. 1 composition borings 17.00-18.00; No. 1 composition solids 17.50-18.50; heavy yellow brass solids 13.50-14.00; yellow brass turnings 12.50-12.75; radiators 13.50-14.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $2.15 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb 99.5; 200-499 lb 98; 500-999 lb 97.5; 1000 lb or more 97.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.000; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.500; 2,500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80; granular, add 1.0 premium to above.

Sodium Stannate: Less than 100 lb 65.2; 100-600 lb 51.4; 700-1900 lb 48.9; 2000-9900 lb 47.1; 10,000 lb or more 46.

Stannous Chloride (Anhydrous): Less than 50 lb $1.497; 50 lb $1.157; 100-300 lb $1.007; 400-900 lb 98.2; 1000-1900 lb 95.8; 2000-4900 lb 92.1; 5000-19,000 lb 86; 20,000 lb and over 79.9.

Stannous Sulphate: Less than 50 lb $1.20; 50 lb 90; 100-1900 lb 88; 2000 lb and over 86.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Nonferrous scrap markets are drum-tight. Main reason is exports, but year-end "vacations" by metal dealers also play a part

RESURGENCY of exports and tax-stimulated year-end "vacations" by metal dealers have drawn nonferrous scrap markets drum-tight.

This is the time of year scrap dealers look to their finances and decide if further exertions will be only for the benefit of the government. If a new tax bracket is looming, they cut down sales and accumulate metal until the calendar turns.

Empty Bins—Exports are an even greater factor in keeping most dealers sold out through most of December. Japan, Germany and Italy are especially active buyers today. That's because they are not large producers of copper, aluminum, lead and zinc and must import their secondary needs. They have no established trading areas either, such as the U. K. has with Commonwealth countries.

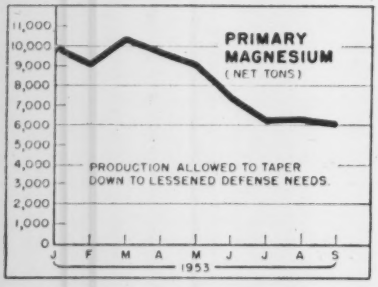
Because the U. S. is by far the largest metalworking nation, it has always been a prime hunting ground for scrap-seekers from abroad. Most European countries use more scrap than they generate, so certain classes of scrap can't be shipped out. Total embargoes on scrap are in effect in most South American countries.

More Licenses—Demand for scrap from abroad has been strong here since Korea, but markets have been nearly closed as exports are under allocation through licensing procedures. To ship scrap out of the U. S., the buyer must have an import license and the seller an order. Then applications for export license must be filed individually.

Only recently has there been greater liberality in granting these licenses by the Commerce department's Office of International Trade and its successor. Since slackened demand from foundries and mills eased the scrap market, there has been little difficulty in getting approval.

What's Needed — Exporters pay higher prices because more rigid sorting is required and because of expenses for export packing and shipping to docks. Most export scrap comes by truck from seaboard areas, with a trickle by rail from inland points. Higher prices paid here can be made up in lower processing costs abroad.

Regular run of copper and brass scrap is being sought, with particular emphasis on No. 2 copper, yellow and red brasses and radiators. One estimate puts fourth-quarter exports of copper scrap at double the third-quarter tonnage. In aluminum, old pots and pans are prized, with



fair demand for castings reported. Zinc die castings and drosses, lead battery plates and lugs are of interest to exporters. If U. S. ingot makers' business picks up so that they enter the market for scrap, a tight squeeze will develop overnight.

Chilean Copper Talks Run On

Status quo prevails in most primary metals. Everyone is his own expert in predicting the windup date of Chilean copper negotiations. Basic agreement has been reached, but top-policy differences combined with the Chileans' desire to talk big for domestic consumption have prevented final accord. Latest in a series of diversionary moves by Chile is a report of a proposed barter deal with Finland. The Finns would pay 35 cents a pound for 50,000 tons of copper and 1 million tons of iron ore, in exchange for an assortment of ocean-going ships, trolley busses and taxis. If assurance can be given that the metal wouldn't wind up behind the iron curtain, the U. S. is likely to give its blessing.

Watched by Tin Traders

Tin traders around the world are watching closely two developments that will affect their business vitally. One is an international conference getting under way in Geneva today that will attempt to bring stability to the industry, perhaps by controlling production and regulating price swings.

The other, which will hit the tin market like a sledgehammer no matter what the decision, is talk between RFC and Indonesia on a '54 tin contract. The 1952-53 sales were at fixed price for about 18,000-22,000 tons yearly. Contract calls for deliveries in 1954 at a price "to be determined."

Antimony Price Sags

Antimony price reduction in London bears witness to the metal's current world-wide weakness. Foreign brands today undersell American brands in New York by 10 to 11 cents, duty paid. Even with supplies from China, normally the world's largest producer, cut off, regulus (antimony metal) is overly plentiful from ores mined in Bolivia, Union of South Africa, Mexico and Peru.

Market men are generally bearish over antimony's future. Price has held at 34.50 cents, f.o.b. Laredo, Tex., since Nov. 3, 1952, but is shaky in face of import competition. Principal uses of antimony are in lead storage batteries, bearing metals, cable sheathing, type metals, frits and ceramic enamels. Because of high recovery of antimony from scrap, chiefly battery plates, the U. S. today uses more secondary metal than primary.

Tungsten Supply Bolstered

Self-sufficiency in metallic tungsten, even during wartime, will be achieved through a battery of six new tungsten furnaces of Wah Chang Corp. of Glen Cove, L. I. Three are now under construction. Only one furnace will be operated and the others held in stand-by. Capacity is not disclosed for military reasons. Ore for the furnaces comes from western states, Asia, Europe and South America.

Nonferrous Briefs

- Lead stocks at smelters and refineries on Oct. 1 dipped slightly to 42,613 tons, and further improvement should be noted in November.
- Custom-rolled phosphor bronze strip in widths up to 6 in. and thicknesses down to 0.0006 in. is now available in any quantity from 1 pound up from American Silver Co., Flushing, N. Y. Tolerances can be held as close as plus-minus 0.0001 in.

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Your Bunting Distributor is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock, for your money saving convenience, completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes meeting all your usual production and maintenance needs. Ask him for catalog.

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STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 175. Key to footnotes, page 177.

—SEMIFINISHED—

INGOTS, Carbon Forging (NT)

Fontana,Calif. K1	$86.00
Munhall,Pa. U5	59.00

INGOTS, Alloy (NT)

Detroit R7	$83.00
Fontana,Calif. K1	88.00
Midland,Pa. C18	62.00
Munhall,Pa. U5	62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)

Aliquippa,Pa. J5	$62.00
Bessemer,Pa. U5	62.00
Buffalo R2	62.00
Clairton,Pa. U5	62.00
Ensley,Ala. T2	62.00
Fairfield,Ala. T2	62.00
Fontana,Calif. K1	61.00
Gary,Ind. U5	62.00
Johnstown,Pa. B2	62.00
Lackawanna,N.Y. B2	62.00
Munhall,Pa. U5	62.00
So.Chicago,Ill. U5	62.00
So.Duquesne,Pa. U5	62.00

Carbon, Forging (NT)

Aliquippa,Pa. J5	$75.50
Bessemer,Pa. U5	75.50
Buffalo R2	75.50
Canton,O. R2	75.50
Clairton,Pa. U5	75.50
Cleveland R2	75.50
Conshohocken,Pa. A3	82.50
Detroit R7	78.50
Ensley,Ala. T2	75.50
Fairfield,Ala. T2	75.50
Fontana,Calif. K1	94.50
Gary,Ind. U5	75.50
Geneva,Utah C11	75.50
Houston S5	75.50
Johnstown,Pa. B2	75.50
Lackawanna,N.Y. B2	75.50
LosAngeles B3	94.50
Munhall,Pa. U5	75.50
Seattle B3	94.50
So.Chicago,Ill. R2,U5,W14	75.50
So.Duquesne,Pa. U5	75.50
So.SanFrancisco B3	94.50

Alloy, Forging (NT)

Bethlehem,Pa. B2	$82.00
Buffalo R2	82.00
Canton,O. R2,T7	82.00
Conshohocken,Pa. A3	89.00
Detroit R7	84.00
Fontana,Calif. K1	101.00
Gary,Ind. U5	82.00
Houston S5	82.00
Ind.Harbor,Ind. Y1	82.00
Johnstown,Pa. B2	82.00
Lackawanna,N.Y. B2	82.00
LosAngeles B3	102.00
Massillon,O. R2	82.00
Midland,Pa. C18	82.00
Munhall,Pa. U5	82.00
So.Chicago,R2,U5,W14	82.00
So.Duquesne,Pa. U5	82.00
Struthers,O. Y1	82.00
Warren,O. C17	82.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$92.50
Canton,O. R2	92.50
Cleveland R2	92.50
Fontana,Calif. K1	113.50
Gary,Ind. U5	92.50
Massillon,O. R2	92.50
So.Chicago,Ill. R2	92.50
So.Duquesne,Pa. U5	92.50

SHEET BAR (NT)

Fontana,Calif. K1	$93.18

SKELP

Aliquippa,Pa. J5	3.50
Munhall,Pa. U5	3.50
Warren,O. R2	3.50
Youngstown R2,U5	3.50

WIRE RODS

Alabama City,Ala. R2	4.525
Aliquippa,Pa. J5	4.525
Alton,Ill. L1	4.525
Buffalo,W12	4.525
Cleveland,A7	4.525
Donora,Pa. A7	4.525
Fairfield,Ala. T2	4.525
Fontana,Calif. K1	4.525
Houston S5	4.525
Johnstown,Pa. B2	4.525
Joliet,Ill. A7	4.525
Kansas City,Mo. S6	4.525
LosAngeles B3	4.525
Minnequa,Colo. C10	4.775
Monessen,Pa. P2	4.725
So.Tonawanda,N.Y. B11	4.525
Pittsburg,Calif. C11	4.475
Portsmouth,O. P12	4.525
Rockdale,Tex. T6	4.625
So.Chicago,Ill. R2	4.525
SparrowsPoint,Md. B2	4.625
Sterling,Ill. U5,N15	4.525
Struthers,O. Y1	4.525
Torrance,Calif. C11	5.325
Worcester,Mass. A7	4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes

AlabamaCity,Ala. R2	4.10
Aliquippa,Pa. J5	4.10
Bessemer,Ala. T2	4.10
Bethlehem,Pa. B2	4.15
Clairton,Pa. U5	4.10
Fairfield,Ala. T2	4.10
Fontana,Calif. K1	4.75
Gary,Ind. U5	4.10
Geneva,Utah C11	4.10
Houston S5	4.60
Ind.Harbor,Ind. I-2	4.10
Johnstown,Pa. B2	4.15
KansasCity,Mo. S6	4.80
Lackawanna,N.Y. B2	4.15
LosAngeles B3	4.80
Minnequa,Colo. C10	4.60
Munhall,Pa. U5	4.10
Niles,Calif. (22) P1	4.90
Phoenixville,Pa. P4	4.85
Seattle B3	4.85
So.Chicago,Ill. U5,W14	4.10
So.SanFrancisco B3	4.75
Torrance,Calif. C11	4.80
Weirton,W.Va. W6	4.35

Wide Flange

Bethlehem,Pa. B2	4.15
Clairton,Pa. U5	4.10
Fontana,Calif. K1	5.20
Lackawanna,N.Y. B2	4.15
Munhall,Pa. U5	4.10
So.Chicago,Ill. U5	4.10

Alloy Stand. Shapes

Clairton,Pa. U5	5.00
Fontana,Calif. K1	6.40
Gary,Ind. U5	5.00
Munhall,Pa. U5	5.00
So.Chicago,Ill. U5	5.00

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5	6.175
Bessemer,Ala. T2	6.175
Bethlehem,Pa. B2	6.20
Clairton,Pa. U5	6.175
Fairfield,Ala. T2	6.175
Fontana,Calif. K1	6.525
Gary,Ind. U5	6.175
Geneva,Utah C11	6.175
Ind.Harbor,Ind. I-2	6.175
Ind.Harbor,Ind. Y1	6.675
Johnstown,Pa. B2	6.20
Lackawanna,N.Y. B2	6.20
LosAngeles B3	6.80
Munhall,Pa. U5	6.175
Seattle B3	6.90
So.Chicago,Ill. U5,W14	6.175
So.SanFrancisco B3	6.80
Struthers,O. Y1	6.675

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.20
Lackawanna,N.Y. B2	6.20
Munhall,Pa. U5	6.175
So.Chicago,Ill. U5	6.175

BEARING PILES

Munhall,Pa. U5	4.10
So.Chicago,Ill. U5	4.10

—PILING—

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	4.925
Lackawanna,N.Y. B2	4.925
Munhall,Pa. U5	4.925
So.Chicago,Ill. U5	4.925

—PLATES—

PLATES, Carbon Steel

Alabama City,Ala. R2	4.10
Aliquippa,Pa. J5	4.10
Ashland,Ky.(1)A10	4.10
Bessemer,Ala. T2	4.10
Clairton,Pa. U5	4.10
Cleveland,A7 R2	4.10
Conshohocken,Pa. A3	4.75
Coatesville,Pa. L7	4.30
Fairfield,Ala. T2	4.10
Fontana,Calif. (30) K1	4.75
Gary,Ind. U5	4.10
Geneva,Utah C11	4.10
Granite City,Ill. G4	4.10
Harrisburg,Pa. C6	4.95
Houston S5	4.60
Ind.Harbor,Ind. I-2,Y1	4.10
Johnstown,Pa. B2	4.10
Lackawanna,N.Y. B2	4.10
Minnequa,Colo. C10	4.95
Munhall,Pa. U5	4.10
Niles,Calif. P1	4.90
Pittsburg,Calif. C11	4.85
Riverdale,Ill. A1	4.10
Seattle B3	5.00
Sharon,Pa. S3	4.10
So.Chicago,Ill. U5,W14	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.40
Youngstown,R2,U5,Y1	4.10

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1	5.90
Geneva,Utah C11	5.25

PLATES, Wrought Iron

Economy,Pa. B14	9.30

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	6.25
Bessemer,Ala. T2	6.25
Clairton,Pa. U5	6.25
Cleveland,J5	6.25
Conshohocken,Pa. A3	6.25
Ecorse,Mich. G5	6.45
Fairfield,Ala. T2	6.25
Fontana,Calif. (30) K1	6.95
Gary,Ind. U5	6.25
Geneva,Utah C11	6.25
Ind.Harbor,Ind. I-2	6.25
Ind.Harbor,Ind. Y1	6.75
Johnstown,Pa. B2	6.25
Lackawanna,N.Y. B2	6.25
Munhall,Pa. U5	6.25
Pittsburgh,Ja.	6.25
Seattle B3	7.15
Sharon,Pa. S3	6.25
So.Chicago,Ill. U5,W14	6.25
SparrowsPoint,Md. B2	6.25
Youngstown U5	6.25
Youngstown Y1	6.75

PLATES, Alloy

Claymont,Del. C22	5.55
Coatesville,Pa. L7	5.75
Fontana,Calif. K1	6.60
Gary,Ind. U5	5.50
Johnstown,Pa. B2	5.50
Munhall,Pa. U5	5.50
Sharon,Pa. S3	5.50
So.Chicago,Ill. U5,W14	5.50
SparrowsPoint,Md. B2	5.50

FLOOR PLATES

Cleveland,J5	5.15
Conshohocken,Pa. A3	5.15
Ind.Harbor,Ind. I-2	5.15
Munhall,Pa. U5	5.15
So.Chicago,Ill. U5	5.15

PLATES, Ingot Iron

Ashland,Ky.(1)A10	4.35
Ashland,Ky.(1)(3)A10	4.85
Cleveland,A7 R2	4.70
Warren,O. C17 R2	4.70

—BARS—

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2	4.15
Aliquippa,Pa. J5	4.15
Alton,Ill. L1	4.35
Atlanta,Ga. A11	4.40
Bessemer,Ala. T2	4.15
Buffalo R2	4.15
Canton,O. R2	4.15
Clairton,Pa. U5	4.15
Cleveland R2	4.15
Detroit R7	4.30
Ecorse,Mich. G5	4.35
Emeryville,Calif. J7	4.90
Fairfield,Ala. T2	4.15
Fontana,Pa. U5	4.30
Fontana,Calif. K1	4.85
Gary,Ind. U5	4.15
Houston S5	4.65
Ind.Harbor,Ind. I-2,Y1	4.15
Johnstown,Pa. B2	4.15
KansasCity,Mo. S6	4.85
Lackawanna,N.Y. B2	4.15
LosAngeles B3	4.85
Milton,Pa. M18	4.15
Minnequa,Colo. C10	4.60
Niles,Calif. P1	4.85
N.Tonawanda,N.Y. B11	4.15
Pittsburg,Calif. C11	4.85
Pittsburgh,Ja.	4.15
Portland,Oreg. O4	4.90
Seattle B3,N14	4.90
So.Chicago,Ill. R2,U5,W14	4.15
So.Duquesne,Pa. U5	4.15
So.SanFran.,Calif. B3	4.90
Sterling,Ill. N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	4.85
Weirton,W.Va. W6	4.30
Youngstown R2,U5	4.15

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	4.875
Buffalo R2	4.875
Canton,O. R2,T7	4.875
Clairton,Pa. U5	4.875
Detroit R7	4.975
Ecorse,Mich. G5	5.075
Fontana,Calif. K1	5.925
Gary,Ind. U5	4.875
Houston S5	5.375
Ind.Harbor,Ind. I-2,Y1	4.875
Johnstown,Pa. B2	4.875
KansasCity,Mo. S5	5.575
Lackawanna,N.Y. B2	4.875
LosAngeles B3	5.925
Massillon,O. R2	4.875
Midland,Pa. C18	4.875
So.Chicago,R2,U5,W14	4.875
So.Duquesne,Pa. U5	4.875
Struthers,O. Y1	4.875
Warren,O. C17	4.875
Youngstown U5	4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.225
Bessemer,Ala. T2	6.225
Bethlehem,Pa. B2	6.225
Clairton,Pa. U5	6.225
Ecorse,Mich. G5	6.425
Fairfield,Ala. T2	6.225
Fontana,Calif. K1	7.475
Gary,Ind. U5	6.225
Ind.Harb.,Ind. Y1	6.725
Ind.Harb.,Ind. I-2	6.225
Johnstown,Pa. B2	6.225
Lackawanna,N.Y. B2	6.225
LosAngeles B3	6.925
Pittsburgh,Ja.	6.225
Seattle B3	6.975
So.Chicago,W14	6.225
So.Duquesne,Pa. U5	6.225
So.SanFrancisco B3	6.975
Struthers,O. Y1	6.725
Youngstown U5	6.225

BAR SIZE ANGLES, H.R. CARBON

Bethlehem,Pa. B2	4.35

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5	4.15
Atlanta,A11	4.40
Niles,Calif. P1	4.85
SanFrancisco,S7	5.10

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.00
Fontana,Calif. K1	6.00
Gary,Ind. U5	5.00
Houston S5	5.50
KansasCity,S5	5.50
Youngstown U5	5.00

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	5.20
BeaverFalls,Pa. M12,R2	5.20
Buffalo B5	5.25
Camden,N.J. P13	5.65
Carnegie,Pa. C12	5.20
Chicago W18	5.20
Cleveland,A7,C20	5.20
Detroit P17,R7	5.35
Detroit B5	5.40
Donora,Pa. A7	5.20
Elyria,O. W8	5.20
Franklin Park,Ill. S6	5.20
Gary,Ind. R2	5.20
GreenBay,Wis. F7	5.20
Hammond,Ind. L2,M13	5.20
Hartford,Conn. R2	5.75
Harvey,Ill. B5	5.20
LosAngeles R2	6.65
Mansfield,Mass. B5	5.75
Massillon,O. R2,R8	5.20
Monaca,Pa. S17	5.20
Newark,N.J. W18	5.65
NewCastle,Pa. (17) B4	5.20
Pittsburgh,Ja.	5.20
Plymouth Mtg.,Pa.	5.45
Putnam,Conn. W18	5.75
Readville,Mass. C14	5.75
St.Louis,Mo. M6	5.60
So.Chicago,Ill. W14	5.20
SpringCity,Pa. K3	5.65
Struthers,O. Y1	5.20
Wankegan,Ill. A7	5.20
Worcester,Mass. W10	6.10
Youngstown F3,Y1	5.20

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. G6	C19 4.45

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	6.325
BeaverFalls,Pa. M12	6.325
Bethlehem,Pa. B2	6.325
Buffalo B5	6.325
Camden,N.J. P13	6.765
Canton,O. R2,T7	6.325
Carnegie,Pa. C12	6.325
Chicago W18	6.325
Cleveland,A7,C20	6.325
Detroit P7	6.425
Detroit P17	6.475
Detroit B5	6.525
Donora,Pa. A7	6.325
Elyria,O. W8	6.325
Gary,Ind. R2	6.325
Hammond,Ind. L2,M13	6.325
Hartford,Conn. R2	6.775
Harvey,Ill. B5	6.325
Lackawanna,N.Y. B2	6.325
Mansfield,Mass. B5	6.775
Massillon,O. R2,R8	6.325
Midland,Pa. C18	6.325
Monaca,Pa. S17	6.325
Newark,N.J. W18	6.65
Plymouth,Mich. P6	6.525
So.Chicago,Ill. R2,W14	6.325
SpringCity,Pa. K3	6.475
Struthers,O. Y1	6.325
Warren,O. C17	6.325
Waukegan,Ill. A7	6.325
Worcester,Mass. A7	6.625
Youngstown F3,Y1	6.325

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2	4.15
Atlanta,A11	4.40
Buffalo R2	4.15
Cleveland R2	4.15
Emeryville,Calif. J7	4.90
Fairfield,Ala. T2	4.15
Fairless,Pa. U5	4.30
Fontana,Calif. K1	4.85
Gary,Ind. U5	4.15
Houston S5	4.65
Ind.Harbor,Ind. I-2,Y1	4.15
Johnstown,Pa. B2	4.15
KansasCity,Mo. S6	4.85
Lackawanna,N.Y. B2	4.15
LosAngeles B3	4.85
Milton,Pa. M18	4.15
Minnequa,Colo. C10	4.75
Niles,Calif. P1	4.85
Pittsburg,Calif. C11	4.85
Pittsburgh,Ja.	4.15
SandSprings,Okla. S6	5.05
Seattle B3,N14	4.90
So.Chicago,Ill. R2	4.15
So.Duquesne,Pa. U5	4.15
So.SanFrancisco B3	4.90
SparrowsPoint,Md. B2	4.15
Sterling,Ill. (1) N15	4.15
Struthers,O. Y1	4.15
Torrance,Calif. C11	4.85
Youngstown R2,U5	4.15

BARS, Reinforcing (Fabricated; to consumers)

Johnstown, ½-1" B2	5.55
KansasCity,S6	6.35
LosAngeles B3	6.15
Marion,O. P11	5.55
Seattle,N14	5.80
Seattle B3	6.25
So.SanFrancisco B3	6.25
SparrowsPt., ½-1" B2	5.50
Williamsport,Pa.,#8-#9	5.45

RAIL STEEL BARS

Axis,Pa.(1) J5	4.25
ChicagoHts.(1) (22)	4.50
ChicagoHts.(1) (2)	4.75
ChicagoHts.(1)(3) I-2	4.50
FortWorth,Tex.(26) T4	4.65
Franklin Park,Ill.(3) F9	4.50
Franklin,Pa.(1) F9	4.75
Marion,O.(3) P11	4.50
Moline,Ill.(3) R2	4.50
Tonawanda,(3) B12	5.00
Williamsport,Pa.(3) S19	5.25
Williamsport,Pa.(1) S19	5.45

BARS, Wrought Iron

Economy,Pa.(5)R3,B14	10.40
Economy,Pa.(1)R3,B14	12.90
Economy(Staybolt),B14	13.20
M.K.Rks.(Staybolt),Lo	13.50
M.K.Rks.(5)R3,L5	10.40
M.K.Rks.(1)R3,L5	14.90

—SHEETS—

SHEETS, Hot-Rolled Steel (18 gage and heavier)

Alabama City,Ala. R2	3.925
Ecorse,Mich. P7	3.925
Ashland,Ky.(1)(3)A10	3.925
Butler,Pa. A10	3.925
Cleveland,J5 R2	3.925
Conshohocken,Pa. A3	4.05
Detroit M1	4.15
Ecorse,Mich. G5	4.125
Fairfield,Ala. T2	3.925
Fairless,Pa. U5	4.025
Fontana,Calif. K1	4.70
Gary,Ind. U5	3.925
Geneva,Utah C11	4.025
Granite City,Ill. G4	4.125
Ind.Harbor,Ind. I-2,Y1	3.925
Irvin,Pa. U5	3.925
Kokomo,Ind. C16	4.025
Lackawanna,N.Y. B2	3.925
Mansfield,Ohio E2	4.025
Middletown,O. A10	3.925
Monessen,Pa. P2	3.925
Niles,O. N5	3.925
Portsmouth,O. P12	3.925
Riverdale,Ill. A1	3.925
Sharon,Pa. S3	3.925
So.Chicago,Ill. R2,U5	3.925
So.Duquesne,Pa. U5	3.925
So.SanFran.,Calif. B3	4.90
Sterling,Ill. N15	3.925
Warren,O. R2	3.925
Weirton,W.Va. W6	3.925
Youngstown R2,U5	3.925

Munhall,Pa. U5 ..... 3.925
Newport,Ky. N9 ..... 3.925
Niles,O. N12 ..... 5.425
Pittsburg,Calif. C11 ..... 4.625
Pittsburgh J5 ..... 3.925
Riverdale,Ill. A1 ..... 3.925
Sharon,Pa. S3 ..... 3.925
So.Chicago,Ill. W14 ..... 3.925
SparrowsPoint,Md. B2 ..... 3.925
Steubenville,O. W10 ..... 3.925
Torrance,Calif. C11 ..... 4.625
Warren,O. R2 ..... 3.925
Weirton,W.Va. W6 ..... 3.925
Youngstown U5, Y1 ..... 3.925

SHEETS, H.R. (19 gage)

AlabamaCity, Ala. R2 ..... 5.225
Dover,O. R1 ..... 5.80
Mansfield,O. E6 ..... 5.80
Niles,O. N12 ..... 5.20
Torrance,Calif. C11 ..... 5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 5.90
Conshohocken,Pa. A3 ..... 5.90
Ecorse,Mich. G5 ..... 6.10
Fairfield,Ala. T2 ..... 5.90
Fontana,Calif. K1 ..... 7.00
Gary,Ind. U5 ..... 5.90
Ind.Harbor,Ind. I-2 ..... 5.90
Ind.Harbor,Ind. Y1 ..... 6.40
Irvin,Pa. U5 ..... 5.90
Lackawanna,N.Y. B2 ..... 5.90
Munhall,Pa. U5 ..... 5.90
Pittsburgh J5 ..... 5.90
Sharon,Pa. S3 ..... 5.90
So.Chicago,Ill. U5 ..... 5.90
SparrowsPoint,Md. B2 ..... 5.90
Warren,O. R2 ..... 5.90
Weirton,W.Va. W6 ..... 6.175
Youngstown U5 ..... 5.90
Youngstown Y1 ..... 6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..... 4.175
Cleveland R2 ..... 4.525
Ind.Harbor,Ind. I-2 ..... 4.175
Warren,O. R2 ..... 4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 4.775
Butler,Pa. A10 ..... 4.775
Cleveland J5, R2 ..... 4.775
Ecorse,Mich. G5 ..... 4.975
Fairfield,Ala. T2 ..... 4.775
Fairless,Pa. U5 ..... 4.875
Follansbee,W.Va. F4 ..... 5.775
Fontana,Calif. K1 ..... 5.875
Gary,Ind. U5 ..... 4.775
GraniteCity,Ill. G4 ..... 4.975
Ind.Harbor,Ind. I-2,Y1 ..... 4.775
Irvin,Pa. U5 ..... 4.775
Lackawanna,N.Y. B2 ..... 4.775
Middletown,O. A10 ..... 4.775
Pittsburg,Calif. C11 ..... 5.725
Pittsburgh J5 ..... 4.775
SparrowsPoint,Md. B2 ..... 4.775
Steubenville,O. W10 ..... 4.875
Warren,O. R2 ..... 4.775
Weirton,W.Va. W6 ..... 5.775
Youngstown Y1 ..... 4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.225
Ecorse,Mich. G5 ..... 7.425
Fontana,Calif. K1 ..... 8.275
Gary,Ind. U5 ..... 7.225
IndianaHarbor,Ind. Y1 ..... 7.725
Irvin,Pa. U5 ..... 7.225
Lackawanna,N.Y. B2 ..... 7.225
Pittsburgh J5 ..... 7.225
SparrowsPoint,Md. B2 ..... 7.225
Warren,O. R2 ..... 7.225
Weirton,W.Va. W6 ..... 7.475
Youngstown Y1 ..... 7.725

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10 ..... 5.275
Cleveland R2 ..... 5.375
Middletown,O. A10 ..... 5.275
Warren,O. R2 ..... 5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 ..... 5.275
Ashland,Ky. (8) A10 ..... 5.275
Canton,O. R2 ..... 5.275
Dover,O. R1 ..... 5.525
Fairfield,Ala. T2 ..... 5.275†
Gary,Ind. U5 ..... 5.275†
GraniteCity,Ill. G4 ..... 5.475
Ind.Harbor,Ind. I-2 ..... 5.325
Irvin,Pa. U5 ..... 5.275†
Kokomo,Ind.(13) C16 ..... 5.375
MartinsFerry,O. W10 ..... 5.275
Niles,O. N12 ..... 5.80
Pittsburg,Calif. C11 ..... 6.025†
SparrowsPoint,Md. B2 ..... 5.275
Steubenville,O. W10 ..... 5.275
Torrance(8),Calif. C11 ..... 6.275†
Weirton,W.Va. W6 ..... 5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10 High-Strength Low-Alloy

Irvin,Pa. U5 ..... 7.925
SparrowsPoint(39) B2 ..... 8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..... 5.525
Canton,O. R2 ..... 6.025

SHEETS, Culvert

	Cu	Cu
	Alloy	Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.475	6.925
Fairfield, T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind.Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.325	....
MartinsFry.,O.W10	6.075	....
Pitts.,Cal. C11	6.825	....
SparrowsPt. B2	6.075	....
Torrance,Cal. C11	6.825	....

SHEETS, Culvert

	Pure Iron
Ashland,Ky. A10	6.575
Fairfield, Ala.,T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 5.825
Irvin,Pa. U5 ..... 5.825†
Kokomo,Ind.(13) C16 ..... 5.925
Niles,O. N12 ..... 6.35

†Based on 5c zinc.

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 ..... 5.525
Middletown,O. A10 ..... 5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 ..... 5.775
Middletown,O. A10 ..... 5.775

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ..... 5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..... 5.175
Cleveland R2 ..... 5.175
Gary,Ind. U5 ..... 5.175
GraniteCity,Ill. G4 ..... 5.375
Ind.Harbor,Ind. I-2 ..... 5.175
Irvin,Pa. U5 ..... 5.175
Middletown,O. A10 ..... 5.175
Niles,O. N12 ..... 6.725
Youngstown Y1 ..... 5.175

BLUED STOCK, 29 ga.

Yorkville,O. W10 ..... 7.20
Follansbee,W.Va. F4 ..... 7.30
Follansbee (23) F4 ..... 7.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 ..... 5.675
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 ..... 5.675
Niles,O. N12 ..... 6.00
Weirton,W.Va. W6 ..... 5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ..... 6.075

SHEETS, Well Casing

Fontana,Calif. K1 ..... 6.20

—STRIP—

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..... 3.925
Allenport,Pa. P7 ..... 3.925
Alton,Ill. LI 4.10
Ashland,Ky.(8) A10 ..... 3.925
Atlanta, A11 ..... 4.175
Bessemer,Ala. T2 ..... 3.925
Bridgeport,Conn.(10)S15 4.15
Buffalo (27) R2 ..... 3.925
Butler,Pa.(8) A10 ..... 3.925
Carnegie,Pa. S18 ..... 4.125
Conshohocken,Pa. A3 ..... 4.00
Detroit M1 ..... 4.15
Ecorse,Mich. G5 ..... 4.125
Fairfield,Ala. T2 ..... 3.925
Fontana,Calif. K1 ..... 4.70
Gary,Ind. U5 ..... 3.925
Houston,Tex. S6 ..... 4.425
Ind.Harbor,Ind. I-2,Y1 3.925
Johnstown,Pa.(25) B2 ..... 3.925
Kansas City,Mo.(9) S5 ..... 4.625
Lackawanna,N.Y.(32) B2 3.925
LosAngeles(25) B3 ..... 4.65
Milton,Pa. M18 ..... 3.925
Munhall,Pa. U5 ..... 3.925
Newport,Ky. N9 ..... 3.925
NewBritain,Conn.(10) S15 ..... 4.15
Niles,O. N12 ..... 4.125
Pittsburg,Calif. C11 ..... 4.675
Riverdale,Ill. A1 ..... 3.925
SanFrancisco S7 ..... 5.10
Seattle(25) B4 ..... 4.925
Seattle N14 ..... 4.925
Sharon,Pa. S3 ..... 3.925
So.Chicago,Ill. W14 ..... 3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2 3.925
Torrance,Calif. C11 ..... 4.675
Warren,O. R2 ..... 3.925
Weirton,W.Va. W6 ..... 4.025
Youngstown Y1, U5 ..... 3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 ..... 6.40
Fontana,Calif. K1 ..... 7.80
Gary,Ind. U5 ..... 6.40
Houston,Tex. S6 ..... 6.90
KansasCity,Mo. S5 ..... 7.10
LosAngeles B3 ..... 7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 ..... 6.40
So.Chicago,Ill. W14 ..... 6.40
Youngstown U5 ..... 6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ..... 5.65
Conshohocken,Pa. A3 ..... 5.90
Ecorse,Mich. G5 ..... 6.15
Fairfield,Ala. T2 ..... 5.65
Fontana,Calif. K1 ..... 7.05
Gary,Ind. U5 ..... 5.95
Ind.Harbor,Ind. I-2 ..... 5.95
Ind.Harbor,Ind. Y1 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.00
LosAngeles(25) B3 ..... 6.40
Seattle(25) B3 ..... 6.65
Sharon,Pa. S3 ..... 5.95
So.SanFrancisco(25)B3 6.40
SparrowsPoint,Md. B2 6.00
Warren,O. R2 ..... 5.95
Weirton,W.Va. W6 ..... 6.30
Youngstown Y1 ..... 6.45
Youngstown U5 ..... 5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..... 4.175
Warren,O. R2 ..... 4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ..... 5.80
Bridgeport,Conn.(10) S15 5.75
Butler,Pa. A10 ..... 5.45
Cleveland A7, J5 ..... 5.40
Dearborn,Mich. D5 ..... 5.70
Detroit D2, P20 ..... 5.50
Detroit M1 ..... 5.65
Dover,O. G6 ..... 5.80
Ecorse,Mich. G5 ..... 5.65
Follansbee,W.Va. F4 ..... 5.45
Fontana,Calif. K1 ..... 7.35
FranklinPark,Ill.(40) T6 5.70
Ind.Harbor,Ind. I-2 ..... 5.70
Lackawanna,N.Y. B2 ..... 5.45
LosAngeles C1 ..... 7.50
Mattapan,Mass. T6 ..... 6.30
Middletown,O. A10 ..... 5.45
NewBedford,Mass. R10, 6.40
NewBritain,(10) S15 ..... 5.75
NewCastle,Pa. B4 ..... 5.45
NewCastle,Pa. E3 ..... 5.95
NewHaven,Conn. A7 ..... 5.95
NewHaven,Conn. D2 ..... 6.20
Pawtucket,R.I. R3 ..... 6.80
Pawtucket,R.I.(21), NS, 6.65
Riverdale,Ill. (40) A1 ..... 5.70
Rome,N.Y.(29), R6 ..... 5.45
Sharon,Pa. S3 ..... 5.45
SparrowsPoint,Md. B2 ..... 5.45
Trenton,N.J. R5 ..... 7.00
Wallingford,Conn. W2 ..... 6.20
Warren,O.(40) T5 ..... 5.95
Warren,O. B6 ..... 5.75
Warren,O. R2 ..... 5.45
Weirton,W.Va. W6 ..... 5.45
Worcester,Mass. W19 ..... 7.05
Youngstown C8 ..... 5.95
Youngstown Y1 ..... 5.45

STRIP, Cold-Rolled Alloy Steel

Bridgeport,Conn.(10)S15 12.15
Carnegie,Pa. S18 ..... 12.00
Cleveland A7 ..... 12.00
Dover,O. G6 ..... 12.00
Fontana,Calif. K1 ..... 13.65
Harrison,N.J. C18 ..... 12.00
NewBritn.,Conn.(10)S15 12.15
Pawtucket,R.I.(41) NS 12.15
Pawtucket,R.I.(42) NS 12.45
Sharon,Pa. S3 ..... 12.00
Worcester,Mass. A7 ..... 12.00
Youngstown C8 ..... 12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 ..... 7.80
Cleveland A7 ..... 8.15
Dearborn,Mich. D3 ..... 7.90
Dover,O. G6 ..... 8.00
Ecorse,Mich. G5 ..... 8.35
Lackawanna,N.Y. B2 ..... 8.15
Sharon,Pa. S3 ..... 7.65
SparrowsPoint,Md. B2 ..... 8.15
Warren,O. R2 ..... 7.60
Weirton,W.Va. W6 ..... 8.30
Youngstown Y1 ..... 8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ..... 6.05

STRIP, Electrogalvanized

Dover,O. G6 ..... 5.70
Warren,O. T5 ..... 5.70
Weirton,W.Va. W6 ..... 5.45
Youngstown C8 ..... 5.95

TIGHT COOPERAGE HOOP

Atlanta, A11 ..... 4.65
Riverdale,Ill. A1 ..... 4.50
Sharon,Pa. S3 ..... 4.35
Youngstown U5 ..... 4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American CladmetalsCo.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co. Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Duston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Madart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Electric Steel

N2 National Supply Co.
N3 National Tube Div.
N4 Newton Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O1 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod.Steel Strip Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Ruebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 StainlessWeldedProducts
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Wellington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West Auto Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	8.00	8.60	10.55	12.85
Bridgeport,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	...
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Dearborn,Mich. D3	5.70	7.85	8.90	...	...
Detroit D2	6.45	7.85	8.45	10.55	...
Dover,O. G6	6.05	8.00	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	...
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	...	...
NewCastle,Pa. E5	5.95	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	6.70	7.95	8.55	10.50	...
NewYork W3	...	8.30	8.90	10.85	13.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	...	8.00	8.60	10.55	12.85
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	8.30	8.90	10.85	13.15
Wallingford,Conn. W2	6.20	7.95	8.90	10.85	13.15
Warren,O. T2	6.20	8.00	8.60	10.55	12.85
Weirton,W.Va. W6	5.80	8.00	8.60	10.55	12.85
Worcester,Mass. A7	5.75	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8	...	8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	...
FranklinPark,Ill. T6	...	...	12.50	15.00	18.00
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Youngstown C8	...	...	12.50	15.00	18.00

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (cut lengths ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W10 (cut lengths)	...	...	8.35	9.60	10.40
Brackenridge,Pa. A4	...	...	8.85	10.10	10.90
GraniteCity,Ill. G4 (cut lengths)	...	...	8.55	9.80	...
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(34)	...
Mansfield,O. B6 (cut lengths)	7.55	7.85	8.35	9.60	10.40
Newport,Ky. N9 (cut lengths)	...	7.85	8.35	9.60	10.40
Niles,O. N12 (cut lengths)	7.55	7.85	8.35	...	...
Vandergrift,Pa. U5	...	8.35	8.85	10.10	10.90
Warren,O. R2	8.05	8.35	8.85	10.10	10.90
Zanesville,O. A10	...	8.35	8.85	10.10	10.90

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower)	Transformer Grade 72	65	58	52
BeechBottom W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	11.45	...	...	...
Newport,Ky. N9 (cut lengths)	10.95	...	...	...
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45	...	...	...
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	16.05	16.55
Vandergrift,Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	...
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.55

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.775
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.525
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Torrance,Calif. C11	6.475
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.525

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
Millbury,Mass. (12) N6	8.725
Minnequa,Colo. C10	7.175
Monessen,Pa. P7	6.925
Monessen,Pa. P16	6.95
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.875
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Torrance,Calif. C11	7.575
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)	
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.60
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P16	8.00
Monessen,Pa. P7	7.45
Pawtkt.R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20**
Atlanta A11	6.925 7.475
Bartonville(19)K4	6.675 7.225
Buffalo W12	6.675 7.075
Cleveland A7	6.675 ...
CrawfordsvilleM8	6.775 7.325
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Johnstown(24S)	6.675 7.225
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo,Ind. C16	6.775 7.175
LosAngeles B3	7.625 ...
Minnequa,Colo. C10	6.925 7.325**
Monessen,P7(48)	6.675 7.225
Palmer,Mass. W12	6.975 7.375
Pitts.,Calif. C11	7.625 8.025†
Prtsmth.(18) P12	6.675 ...
Rankin,Pa. A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
So.S.Fran.(48)C10	7.625 8.025**
SparrsPt. B2(48)	6.775 7.325
Sterl'g(1)(48)N15	6.675 7.225
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975 ...

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Galv. Stone	Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	10.63	12.72*
Bartonville(19)K4	10.73	12.51
Cleveland A7	12.50	...
Crawfordsville M8	12.50	14.35
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35
Kokomo C16	12.60	14.15
Minnequa C10	12.75	14.45**
Palmer,Mass.W12	12.50	14.05
Pitts.,Calif. C11	12.85	14.40†
So.Chicago R2	12.50	14.05**
SparrowsPt. B2	12.60	14.45
Sterling(1) N15	10.73	12.15
Waukegan A7	12.50	14.05†
Worcester A7	12.80	...

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WIRE, Barbed	Col.
AlabamaCity R2	153**
Aliquippa J5	150*
Atlanta A11	159
Bartonville,Ill. (19) K4	156
Crawfordsville,Ind. M8	159
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156
Joliet,Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	173**
SparrowsPoint,Md. B2	158
Sterling,Ill.(1) N15	156

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.	
Ala.City,Ala. R2	140**
Ala.City 17 ga. R2	235**
Ala.City 18 ga. R2	245**
Aliqp'pa,Pa.9-14½ga. J5	143*
Atlanta A11	146
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6" B2	234
Johnstown, 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	152
Bartonville,Ill.(19) K4	149
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Portsmouth,O. P12	132
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, Cut (100 lb keg) to dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	133
Aliquippa,Pa. J5	133
Atlanta A11	136
Bartonville,Ill. (19) K4	133
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Portsmouth,O. P12	132
Rankin,Pa. A7	133
So.Chicago,Ill. R2	133
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2	1-2..145
Duluth,Minn. A7 (49)	136
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	145
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	9.75	19.75	3	22.25	5.5	23.75	7	23.75	7	23	6.25	25.5	8.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	...	...	...	...	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W. Va. W10(††)	25.5	+0.75	17.75	+6	10.25	+10.75	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Butler, Pa. F6 (†)	26.5	+2.75	19.5	+7.25	12.5	+13	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (†)	...	...	...	...	...	...	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fontana, Calif. (§)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	...	...	...	...	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (†)	26.5	−0.25	19.5	+4.25	12.5	+8.5	...	...	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Youngstown Y1 (††)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9, (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
Benwood, W. Va. W10(††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Etna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*) 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; with discounts adjusted on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths, 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.31	18.44
1¼	13	....	25.24	18.12
1½	13	23.12	27.89	20.01
1⅝	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2½	12	37.10	44.75	32.41
2½	12	40.51	48.86	35.70
2¾	12	43.85	52.90	38.66
3	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee All No. 2	Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	....
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	....
Johnstown,Pa. B2	....	....	....	(16)5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.125	....	5.70
Steelton,Pa. B2	4.325	4.225	....	....
Williamsport,Pa. S12	....	....	....	5.20

TIE PLATES	
Fairfield,Ala. T2	5.125
Gary,Ind. U5	5.125
Ind.Harbor,Ind. I-2	5.125
Lackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	5.125
Pittsburg,Calif. C11	5.275
Seattle B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	11.00
Lebanon,Pa. B2	11.00
Minnequa,Colo. C10	11.00
Pittsburgh O3, P14	11.00

JOINT BARS	
Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind.Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Steelton,Pa. B2	5.275

AXLES	
Ind.Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50

STANDARD TRACK SPIKES	
Ind Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	7.05
Pittsburgh J5	7.05
Seattle B3	7.55
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in.,larger 8.90c

⅞-in. under ..... 26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in & ¾-in	5
⅞-in. and larger	3
Longer than 6 in.:	
All diams.	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoe	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. & C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
⅜" and smaller	58
⅞" to 1⅛", inclusive	60
1¼" to 1⅝", inclusive	62
1⅝" and larger	58
C.P. Hex, regular heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
¾" and smaller	40
⅞" to 1½", inclusive	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex.:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼-in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5 & 10
Plated finishes	30 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16", 1 7/16" to 1 15/16", 4.55c; 1 15/16" to 2 5/16", 4.50c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 7.80c.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 26" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; add 0.35c for universal mill.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 9.00c for cut lengths.
(35) 22" and narrower.
(36) 24" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c
(41) 9.10c for cut lengths.
(42) 6.7 gage.
(43) 1 post, add 2 cols. for T post.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.l.f. N.Y., c.l., in bags	11.38
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe, minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	34.00
Antimony, 500 lb lots	78.00
Brass, 20-ton lots	29.50-36.50
Bronze, 10-ton lots	51.00-60.00
Copper:	
Electrolytic	43.25
Reduced	43.25
Lead	21.75
Magnesium	75.00-85.00
Manganese:	
Minus 35 mesh	52.00
Minus 100 mesh	57.00
Minus 200 mesh	62.00
Nickel unannealed	89.50
Nickel Silver 5-ton lots	47.00
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic 99.9% Cr min.	3.50

*Plus cost of metal.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound, subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. Bars; H.R. Strip	H.R. & C.F. Wire	Plates	Sheets	C.R. Strip, Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	35.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50*	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	50.50	53.75	63.50	62.00	....
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	75.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	65.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A, B, C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co., Sharon Steel Corp., Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	39.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

*Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont Del. C22 Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets in Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25-.85	5% Cr Hot Work	0.39
Extra Carbon	0.33-.340	W-Cr Hot Work	0.41
Special Carbon	0.35-.360	V-Cr Hot Work	0.43
Oil Hardening	0.370-.39	Hi-Carbon-Cr.	0.665-.70

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20 25	4 25	1 6	12 25	....	4.055
18 25	4 25	1	4 75	....	2.340
18	4	2	9	....	2.565-2.695
18	4	2	....	....	1.820
18	4	1	....	....	1.580-1.660
13 5	4	3	....	....	1.875
6 4	4 5	1 9	....	5	1.065
6	4	3	....	6	1.300
2	1 4	1 2	....	....	0.495
1 5	4	1	....	8.5	0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON, Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Alabama City, R2	52.38	52.88	....	....
Birmingham, R2	52.38	52.88	....	....
Birmingham, U6	....	52.88	....	....
Woodward, Ala., W15	52.38	52.88	....	....
Cincinnati, deld	....	60.43	....	....
Buffalo District				
Buffalo, R2, H1	56.00	56.50	57.00	....
Tonawanda, N.Y., W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y., T9	....	56.50	57.00	....
Boston, deld	66.65	67.15	67.65	....
Rochester, N.Y., deld	59.02	59.52	60.02	....
Syracuse, N.Y., deld	60.12	60.62	61.12	....
Chicago District				
Chicago, I-3	56.00	56.50	56.50	57.00
Gary, Ind., U5	56.00	....	56.50	....
Indiana Harbor, Ind., I-2	56.00	....	56.50	....
So. Chicago, Ill., W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill., U5	56.00	....	56.50	57.00
Milwaukee, deld	58.17	58.67	58.67	58.17
Muskegon, Mich., deld	....	62.80	62.80	....
Cleveland District				
Cleveland, A7	56.00	56.50	56.50	57.00
Cleveland, R2	56.00	56.50	56.50	....
Akron, O., deld. from Cleve.	58.75	59.25	59.25	59.75
Lorain, O., N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa., B2	58.00	58.50	59.00	59.50
New York, deld	....	62.28	62.78	....
Newark, deld	61.02	61.52	62.02	62.52
Philadelphia, deld	60.75	61.25	61.75	62.25
Birdsboro, Pa., B10	58.00	58.50	....	....
Steelton, Pa., B2	58.00	58.50	59.00	59.50
Swedeland, Pa., A3	58.00	58.50	59.00	59.50
Troy, N.Y., R2	58.00	58.50	59.00	....
Pittsburgh District				
Neville Island, Pa., P6	56.00	56.50	56.50	....
Pittsburgh (N&S sides), Ambridge, Aliquippa, deld	57.37	57.87	57.87	....
McKees Rocks, deld	57.04	57.54	57.54	....
Lawrenceville, Homestead, Wilmerding, Monaca, deld	57.66	58.16	58.16	....
Verona, Trafford, deld	58.19	58.69	58.69	....
Brackenridge, deld	58.45	58.95	58.95	....
Bessemer, Pa., U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa., U5	56.00	....	....	....
McKeesport, Pa., N3	56.00	....	....	57.00
Midland, Pa., C18	56.00	....	....	....
Monessen, Pa., P7	56.00	....	....	....
Youngstown District				
Hubbard, O., Y1	....	....	56.50	....
Sharpsville, Pa., S6	56.00	56.50	56.50	57.00
Youngstown, Y1	....	....	56.50	57.00
Youngstown, U5	56.00	....	....	57.00
Mansfield, O., deld	60.90	....	61.40	61.90
Duluth, I-3	56.00	56.50	56.50	57.00
Erie, Pa., I-3	56.00	56.50	56.50	57.00
Everett, Mass., E1	59.50	63.00	63.50	....
Fontana, Calif., K1	62.00	62.50	....	....
Geneva, Utah, C11	56.00	56.50	....	....
Granite City, Ill., G4	57.90	58.40	58.90	....
Ironton, Utah, C11	56.00	56.50	....	....
Lone Star, Texas, L6	52.00	52.50*	52.50	....
Minnequa, Colo., C10	58.00	59.00	59.00	....
Rockwood, Tenn., T3	....	....	56.50	....
Toledo, O., I-3	56.00	56.50	56.50	57.00
Cincinnati, deld	61.76	62.26	....	....

*Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O., I2, J1	$67.00
Buffalo, H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y., P15	$91.00
Keokuk, Iowa, Openhearth & Fdry., freight allowed K2	95.50
Keokuk, OH & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee, Wash., OH & Fdry., freight allowed K2	95.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood, Tenn., T3	70.00
Steelton, Pa., B2	64.00
Philadelphia, deld.	67.55
Troy, N.Y., R2	64.00

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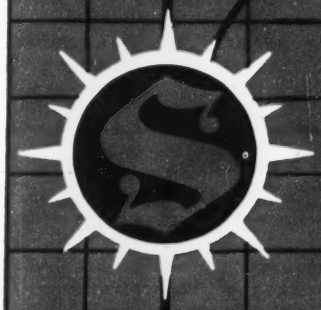


THE SEYMOUR MANUFACTURING COMPANY
SEYMOUR, CONNECTICUT

Nonferrous Alloys Since 1878

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.64	7.78	7.00	...	6.86	8.17[4]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	6.30	...	6.15	8.90	....	6.35	6.35	8.65
Boston	6.89	7.83	9.18	7.13	...	6.87	8.35	12.28	7.06	7.13	8.28
Buffalo	6.18	7.15	8.96	6.79	...	6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	8.00	6.42	...	6.28	7.30	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.42	6.72	...	6.58	7.66	12.17	6.93	6.80	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.65	11.89	6.79	6.50	7.79
Detroit	6.38	7.31	8.29	6.71	7.36	6.56	7.60	11.92	6.93	6.80	7.80
Erie, Pa.	6.19	7.13	9.01	6.54	...	6.28	7.70	....	6.56	6.50	7.79
Houston	7.15	7.60	9.40	7.45	...	7.45	....	....	7.35	7.20	8.65
Jersey City, N.J.	6.54	7.45	8.42	6.82	...	6.75	8.43[4]	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.17	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.35	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.54	7.45	8.42	6.82	...	6.75	8.43[4]	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	8.42	7.16	...	7.06	8.43[4]	....	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.53	7.55	8.41	7.02	8.80	6.87	8.19[4]	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.30	6.55	...	6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	8.15	8.70	9.40	7.90	...	7.60	10.65	....	7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.30	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.66	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00	...	7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40[3]	9.80	7.60	...	7.60	10.55[5]	14.15	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gages extra excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—1000 to 1999 lb; [4]—1000 lb and over; [5]—1500 lb to 3999; [6]—under ½ in.

Warehouse Steel Sales Dip Slightly

Substantial volume of small orders is being booked by distributors, but business is slower than in October. Customers' needs are covered fully except in a few items

Boston Demand for nickel-chromium stainless is slightly heavier. Mill buyers are limited in number and warehouse sales are indicative of trends with distributors placing stainless mill orders more frequently.

In procurement, price has displaced availability, and warehouses will not pay premiums, especially as secondary sales are more competitive. While warehouse orders, on the average, are smaller, they are increasing in number.

Philadelphia Warehouse business for November may be off slightly from that of October. Volume is substantial. In the case of shapes there is not sufficient supply to meet demand. Inventories on most products are building up but the variety of sizes in most products still is lacking.

Cleveland Except for wide flange beams and certain sizes of plates, warehouse stocks are pretty much in balance. Distributors, as a general thing, are able to satisfy their customers' requirements, especially since demand pressure is off from a few months back when certain products were in noticeably short supply. With material more freely available from the mills the warehouses are inclined to order much more cautiously and are not taking everything offered them. There is some shifting to new supply sources also in evidence.

Chicago Major warehouses hold inventories about 85 per cent of normal and they are still improving. Some imbalance in sizes and grades continues. Sheet stocks are gaining and there is better plate supply. Light wide-flange beams, however, are acutely short.

Cincinnati Warehouses are overstocked with cold-finished carbon and alloy bars with demand off.

Pittsburgh Heavy shapes and plates are in tight supply but warehouses here are rounding out stocks of sheets. Cold-rolled sheets are loosening. Sales have declined from earlier high levels. In the easy category are wire and tin mill products, small sizes of bars and alloy steels.

Seattle Warehouse sales volume is holding up well. One large firm reports October business about the same as a year ago. Inventories are

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$4.86	$4.94	$4.86	$5.14
Bar Size Angles	4.53	4.61	4.53	4.81
Structural Angles	4.53	4.61	4.53	4.81
I-Beams	4.80	4.88	4.80	5.08
Wide Flange Beams	4.94	5.02	4.94	5.22
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.87	5.95	5.87	6.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	21.30	21.54	21.30	22.14
Barbed Wire	6.10	6.12	6.10	6.33
Merchant Bars	4.81	4.89	4.81	5.09
Hot Rolled Bands	4.97	5.05	4.97	5.25
Wire Rods, Thomas Commercial No. 5	4.68	4.75	4.73	5.00
Wire Rods, O-H, Cold Heading Quality No. 5	5.14	5.21	5.19	5.46
Channels	4.80	4.88	4.80	5.08
Bright Common Wire Nails, 8d	6.40	6.50	6.45	6.70

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

leveling off. This leaves some houses unable to meet all inquiries. Galvanized sheets are plentiful, hot-rolled are in fair supply, and cold-rolled not so good. Plates are still scarce but the situation is easing.

Some European sheet and H piling have been landed here under domestic prices. Some lots of Japanese plates are on the market at about $6 above domestic levels. Foreign nails and wire have been brought in at less than American prices. Distributors see little market for imported steel when American mills are able to supply all demands.

Los Angeles—With a strike at North American Aviation, Inc., and threatened strikes at other district planemakers' plants, there interests are buying steel for future delivery.

Wire . . .

Wire Prices, Page 176

Boston—Wire mills are operating below capacity in most departments with incoming orders small, but slightly more numerous. Fill-in buying, supplementing lower inventories, is expected through balance of this year. Consumers are entering orders late for prompt delivery.

Pittsburgh—Merchant wire sales are picking up slowly but are still at low level. No sizable gains are expected before yearend. Gradual recovery is taking place in manufacturers wire.

Tubular Goods . . .

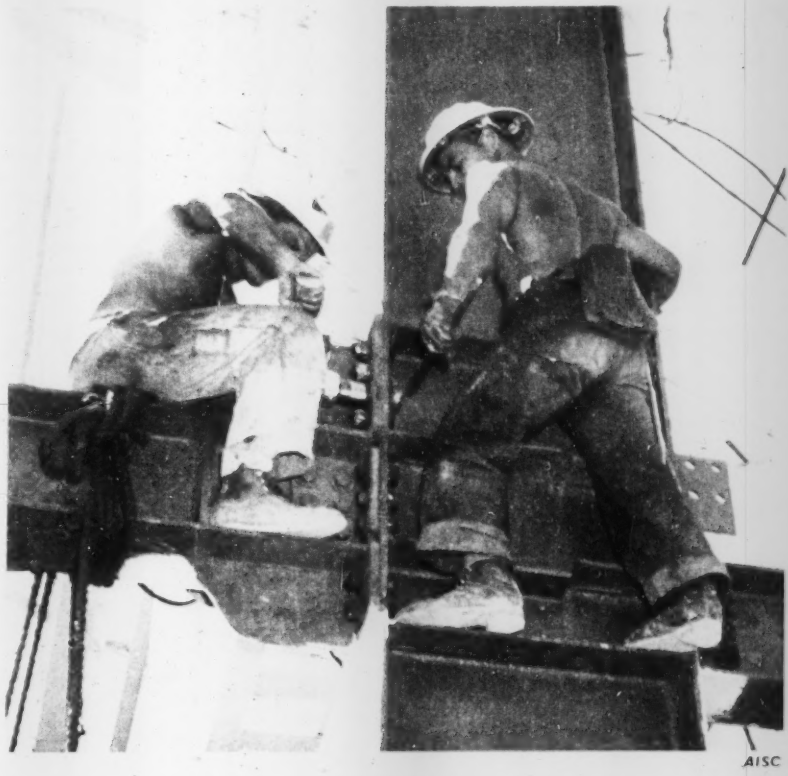
Tubular Goods Prices, Page 177

Clinton, Iowa—Central Steel Tube Co. is installing an electric weld tube mill having a capacity from 7/8-inch O. D. to 4 1/2-inch O. D. minimum wall thickness .0625 maximum wall thickness .187. This new mill will increase the company's annual production by approximately 12,000 tons. It is expected the mill will be in operation beginning Jan. 2, 1954.

Boston—Earlier easing in buttweld pipe has spread to most other tubular products. Distributors who for several months have been turning back buttweld tonnage, are following this pattern for January. Still wanted is seamless, 5 to 10-inch, but outside that range demand for seamless has also slackened. Boiler tubes move slowly and some tubing specialties are turned down for January.

Prices are being equalized through freight absorption on more pipe.

Pittsburgh—Tubing sales for oil country use have been substantial and sellers are booked solid through first quarter. Mechanical seamless tubing demand is depressed. Sales of specialty tubing are slow.



AISC

Wide flange structural shapes are . . .

Tightest Steel Product

THE steel shortage is over for practically everyone except the users of wide flange beams. For a while, the greatest scarcity seemed to be in carbon steel sheets; next it was in carbon plates; and then it shifted to large carbon bars.

After steel became more plentiful and the smoke from the torrid pace of steel demand cleared away, wide flange beams stood out sharply as the form of steel hardest to get.

Wide flange beams are expected to continue tight in supply through the first quarter of next year, and may be well beyond. Why?

Why—Basic reason is that there is an ever-increasing demand for them, without a corresponding increase in producing facilities.

Stepped-up demand is explained in part by growing belief by architects and builders that wide flange sections are more economical and efficient for many requirements than standard structural shapes. Architects and builders say wide flange sections provide a better distribution of metal at points where it will do the most good.

Strengthener—Making the shortage felt even more keenly as this year progressed was the rise in construction activity from the government-controlled levels of last year. In the first nine months of this year, dollar volume of new construction in the U. S. exceeded that of the comparable period of last year by 7.5 per cent.

To help alleviate the shortage, U. S. Steel Corp., one of the two leading producers of wide flange beams, has increased production facilities over the last few years by about 25 per cent at its two mills (Gary, Ind., and Pittsburgh) producing that product.

Bethlehem Steel Co., the other leading producer, with wide flange mills at Bethlehem, Pa., and Lackawanna, N. Y., also has been able to step up output and at present has an important expansion program under contemplation at Bethlehem.

The proposed expansion at Bethlehem will provide a 50 per cent increase in the company's structural mills there, with considerable emphasis on wide flange materials.

Watched by Others—Meanwhile,

SHEPARD NILES CRANE

adds "Wings" to your work-in-process

Watch the way work speeds up when you install a Shepard Niles Crane in your plant! Why? Because through-the-air handling frees manpower for production—speeds the flow of materials—makes more floor space for men and machines. With a Shepard Niles Crane, you put unused ceilings to work—handle heaviest loads safely, easily, at low cost.

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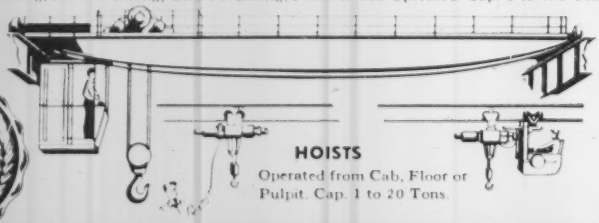
Overhead: Top Running, Inner Running, Under Running, Floor or Cab Operated. Cap. 1 to 450 Tons.



HOISTS
Operated from Cab, Floor or Pulpit. Cap. 1 to 20 Tons.

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some other shape producers rolling modified wide flange sections on standard mills have considered plans for installing equipment which would provide a broad range of wide flange sections. So far, these plans have not materialized.

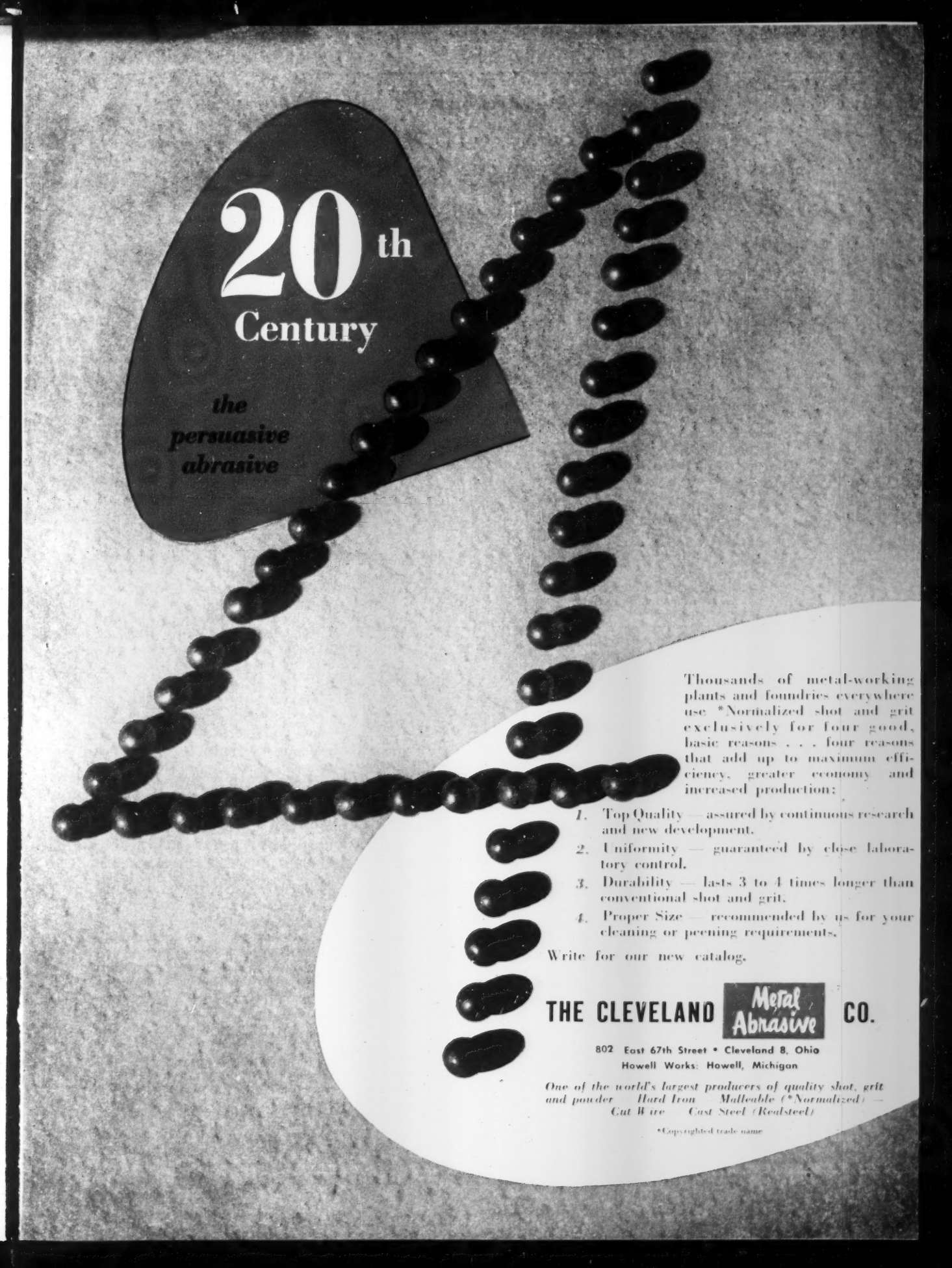
Failure of facilities for producing a broad range of wide flange sections to keep pace with expanding demand is ascribed in part to the cost of installing the necessary equipment, which definitely is more elaborate and complicated than mills required for rolling standard sections. The importance of cost is emphasized by the variance in volume of structural demand over the years. While the over-all trend has been upward, there have been periods when demand for shapes of all types has slumped.

Cause for Hesitation—Even in lush times there has been hesitation because demand for steel has been so heavy for other more profitable items that existing facilities for producing shapes in general have never been pushed to the hilt. In other words, sufficient ingot capacity has never been allocated to that extent. This has been demonstrated even this year.

At the moment this is not so much the case. Pressure of demand on finished steel products generally has eased somewhat, and ingot capacity has been stepped up to around 120 million tons annually. Hence, conditions are favorable for a better shape supply, as already reflected in the noticeably improved availability of standard shapes. So far, these conditions have not influenced the situation in wide flange beams materially.

Pressure—Priorities are still coming through from the government for sections that can be rolled only on a wide flange mill—tonnage which producers have to take, often at the expense of more efficient production on their mills. Moreover, there is still the active demand for construction, especially bridge construction for which wide flange beams are in particular demand.

Today, wide flange shapes represent a large percentage of all the structural sections produced, and as time goes on, the ratio will be still heavier. Meanwhile, modified wide flange beams produced on standard mills, and limited in range, are being consumed quickly. Importers are bringing in modified wide flange sections and are confronted with more demand than they can supply. Also, there is much building up of wide flange sections through fabricating processes. The fabricated sections are more costly than the rolled sections, but they are sorely needed and considered worth the extra cost for various types of work.



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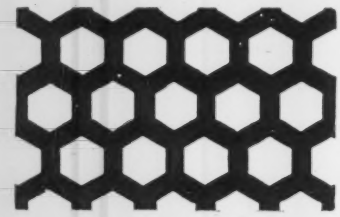

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Hendrick Perforated Metal gives added beauty, strength and utility to products — makes them look better and sell faster!

Available in several hundred eye-appealing designs in commercially rolled metals and gauges with round, square, diamond, hexagonal or slotted perforations. Hendrick Perforated Metal can also be supplied in a combination of plain panel and perforation. For more complete information write to Hendrick direct!

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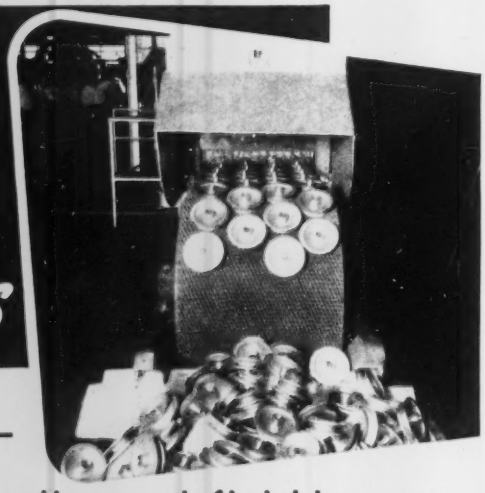

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Brazing also avoids localized overheating, distortion and the cost of straightening. It's ideal for most any size, shape or quantity requirement.

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GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION
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Structural Shapes . . .

Structural Shape Prices, Page 174

Boston—Not until second quarter, at least, are wide flanged beams likely to balance demand. Meanwhile, availability of standard structurals is improving. Freight absorption to equalize on structurals is well in the future.

New York—Structural activity is holding up well despite adverse seasonal influences. Awards of bridge work for the main section of the New York state thruway from Buffalo to this city are expected shortly.

Philadelphia—Shape buyers generally are prompt in getting in specifications by beginning of the January lead-time. There is less pressure for standard sections, but they still are in good demand. As for wide-flange shapes, pressure appears as strong as ever.

Chicago—Structural fabricating shops have enough work in hand to keep them occupied the balance of this year. Supply of plain shapes is improved, except the wide-flange category. Prospects are first quarter business will exceed previous estimates.

Seattle—Subcontracts for several hundred tons of shapes for public works projects are pending. These include Alaskan military installations, new work at Hanford and dam projects in this area.

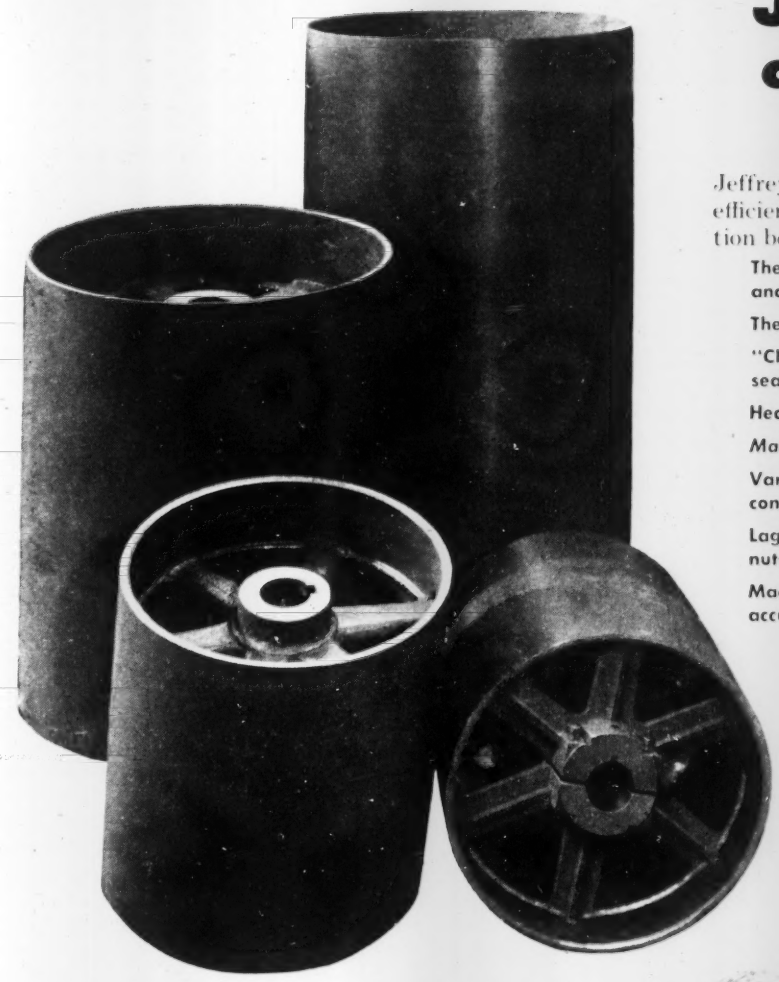
Plates . . .

Plate Prices, Page 174

Philadelphia—Plate business is tapering downward but is far from dull for mills whose prices are at minimum levels. It is not too inactive for premium-price mills whose prices are not exceptionally high and who are able to supply some lighter gages, 3/16 and ¼-inch, in strongest demand. The downtrend is stimulating competition, indicated by reduction of $6 a ton by the Conshohocken, Pa., producer to 4.25c mill, and the policy of the Claymont, Del., producer in meeting 4.35c, mill, in this and certain other areas.

Boston—Carbon plate supply has eased to the extent postwar shops, in some instances without historical position on mill books, are able to establish regular supply connections. Producers are shipping carbon, clad and specialties nearer schedules. Backlogs, however, are not down to the point price equalization through freight absorption is given serious consideration.

First quarter orders are trickling in slowly. Nickel clad inquiry is slightly heavier, and deliveries have



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- They are more resistant to corrosion, abrasion and rust.
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- "Clamp" type hubs really grip shaft, avoid key seat wear.
- Heavy *machine-turned* rims are more accurate.
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Jeffrey Pulleys are cast in one piece from highest quality grey iron. There is a type and size to meet every belt conveyor requirement . . . including single or double arm, solid or clamp hubs, and extra-heavy units for high-tension belts.

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Belt Idlers — *all types*	Drive Chains
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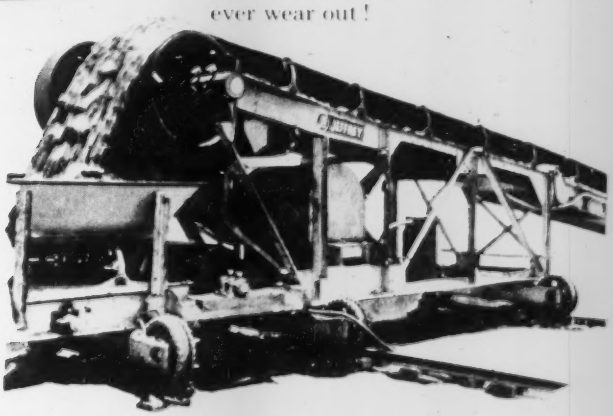

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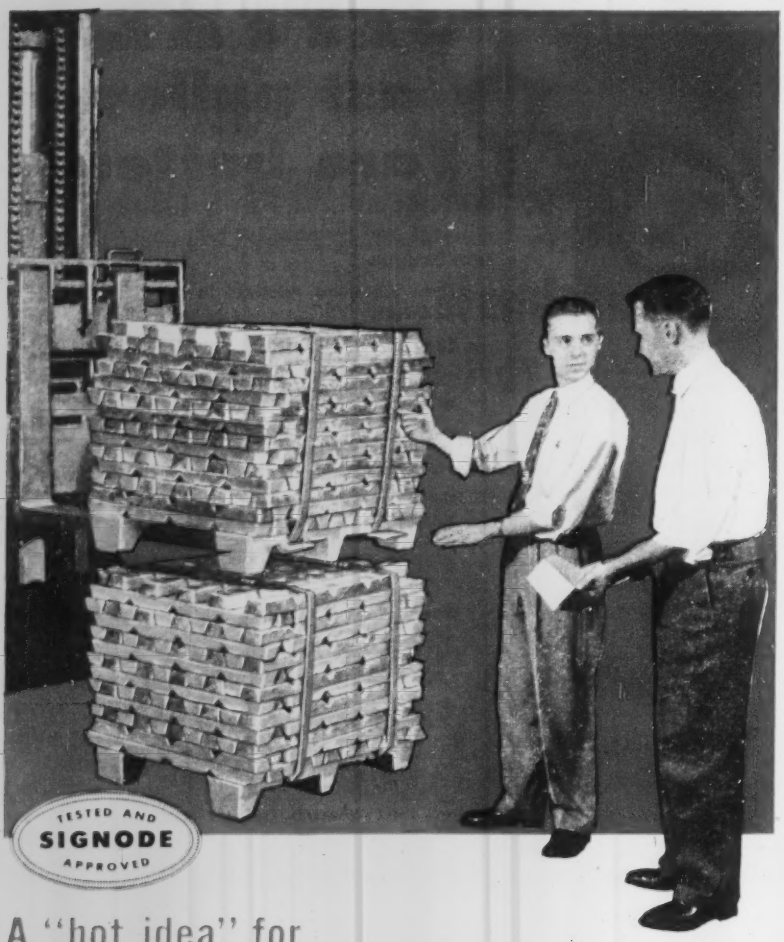

A "hot idea" for
self-palletizing hot zinc ingots

Another example of packaging magic done with Signode Steel Strapping!

Hot ingots once were formidable foes when you tried to package them for fast, safe handling. Then *Signode* gave a practical twist to a basic handling method and the answer was found!

Special molds were designed to form the basic legs, allowing complete self palletization of the units. Other ingots, still hot, were stacked on this base. The entire unit was strapped with Signode material—saving an astonishing amount of man power and tonnage, and ending the need for pallets.

How can you use Signode's broad knowledge of *basic unitizing methods? Find out now!* Our Signode fieldman will help you decide—without obligating you in any way. Write Signode Steel Strapping Co., 2645 N. Western Ave., Chicago 47, Ill. Offices coast to coast. In Canada: Canadian Steel Strapping Co., Ltd. Foreign subsidiaries and distributors world-wide.

SIGNODE Steel Strapping Co.

SEND FOR FOLDER SHOWING 6 BASIC WAYS OF UNITIZING

been cut to 8 weeks as against 12 recently. Shops are getting out heads earlier, 5 to 7 weeks for spun and about 8 for pressed.

Pittsburgh—Ordering of heavy products is less frantic but is strong. One producer can largely satisfy demand, but its order books are filled through balance of this year.

Wheeling Steel Corp. issued a new book of extras for hot-rolled carbon steel plates Nov. 4, superseding its book dated May 15, this year. It contains a new section showing reduced width extras in certain sizes and a lower quality extra for drawing steel. There are increases in two specification extras.

New York—Increasing competition is reflected by the lower prices quoted by some premium-price mills. The Conshohocken, Pa., producer dropped prices $6 per ton to 4.25c mill and the Claymont, Del., producer is meeting competition in this and certain other areas on the basis of 4.35c mill.

Some premium-price mills still have a little capacity open for this year.

Sheets, Strip . . .

Sheet and Strip Prices, Page 174 & 175

Pittsburgh—Order books are well filled for fourth quarter, and producers are looking ahead to January. Current thinking is consumers will require the same tonnage next year. Orders from automakers have declined. Some cancellations are reported in hot-rolled sheet, but the cold-rolled is tight.

Wheeling Steel Corp. issued new extra books for hot-rolled sheets, electrical sheets, galvanized flat sheets and cold-finished sheets Nov. 4. They superseded books dated May 1 and May 4 this year.

Wheeling Steel Corp. expects to shortly bring into operation its new continuous galvanizing line for the production of tight zinc coatings at its Martins Ferry, O., works. The line, costing $3 million, has been under construction over a year.

New principles for zinc coating will be applied in a new process developed by Wheeling research over a period of years.

The equipment is approximately 600 feet in length and will coat coils in gages from 18 to 32, and in widths up to 36 inches. The product of the line will have deep drawing qualities, and, according to the company's news bulletin, will open many new fields for use of galvanized coatings.

Boston—By first quarter, delivered price equalization on hot and cold-rolled carbon sheets will be clearer.

Super Constellation by Lockheed

LINDBERG STEEL TREATING HELPS KEEP YOUR EARS FROM ACHING

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Remember the days of the "airplane ear-ache"? . . the kind caused by low cabin pressure when your plane or airliner flew above 8,000 or 10,000 feet? Well, fortunately, "airplane ear-aches" are pretty much a thing of the past now . . particularly on today's high altitude airliners.

Airlines, always alert to anything that will make passengers more comfortable, called for equipment that would keep cabin pressures normal . . so passengers wouldn't be bothered with ear-aches.

The result was the *cabin pressurization compressor* . . one of the important parts of which is a little impeller wheel. It looks simple . . but it isn't. Some of the country's better engineers spent quite a few years working on it.

Each impeller wheel, after it is machined, has to be heat treated. Engineers of AiResearch Manufacturing Company who developed the wheel (and the compressor) demanded absolutely the correct heat treatment . . for each one represented a great deal of expense, time and effort.

*It was a job for Lindberg Steel Treating Company!** Lindberg heat treating specialists determined precisely the correct method of heat treating . . the required heating temperature . . and exactly the right quenching procedure.

Aircraft inspection standards required that each wheel be inspected, not at one, not at two, not at three . . but at *four* distinct specified locations for proper hardness. No impeller wheel left the Lindberg plant without being certified by serial number. Not a single thing was taken for granted.

If you demand the ultimate in heat treating . . if you insist that nothing be taken for granted . . call Lindberg.

*Heat treated by the Los Angeles division for AiResearch Manufacturing Company, and by the Chicago division for Masterform Tool Company, supplier to AiResearch.

A case history of Lindberg Steel Treating Co. service to American industry

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Re-check YOUR Cost Relief Zone!

Hundreds of Other Men Responsible for Tooling and Production Have Acted on This and Profited!

Here is a step you can take now to get relief from high production costs: *Re-check your tools and dies!* How much production time are you losing because of too frequent shutdown for die regrinding? How much *extra* money are you spending on costly die finishing, adjusting? Are your tools and dies breaking or wearing out too fast? A tool and die re-check will often give you the answers.

Take the job shown above. Knurling mills like this impress patterns on large .35% carbon steel rolls for embossing cloth and plastic. Some of the patterns are fragile and the sections as deep as 1/16" must not collapse. The mills must be hard enough to prevent upsetting, tough enough to prevent edges from breaking under pressures up to 5 tons. A re-check of the job showed that better performance could be expected if a more dependable die steel were used. Carpenter No. 11 Special (Water-Hard) met all of these requirements . . . and provided the necessary cost relief.

If you're looking for immediate ways to bring costs down to a respectable level, act on this now. Use the Carpenter Matched Set Method to select the one steel best suited to cut costs. This Method is backed by *dependable* tool and die steels that *stay* on the job. Then, for rush delivery, call your nearest Carpenter Mill-Branch Warehouse or Distributor. THE CARPENTER STEEL COMPANY, 139 W. BERN ST., READING, PA.

Are You Missing These Opportunities In *Your* Cost Relief Zone?

- Less die finishing and adjusting
- Greater output between grinds
- Fewer heat treating failures
- Less machine downtime

On Job After Job Carpenter Matched Tool and Die Steels Have Made Them Possible!

Carpenter

Matched Tool and Die Steels

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U. S. A. and Canada

More producers will absorb freight to equalize with Morrisville, Pa., and Sparrows Point shipments and to that extent steel costs to consumers buying from more distant points will be lower. Buffalo will be competitive without much absorption.

Premium prices on flat-rolled, including several cold strip adjustments, are being marked down.

New York—Consumers of hot and cold-rolled sheets are making forward commitments cautiously, but buying is fairly active. The local market is attracting the Detroit producer, competing with the Fairless, Pa., mill. This means freight absorption of about $12 or $13 per ton, it is said, as well as absorption of the differential in base prices between these two producing points. The Weirton, W. Va., producer also is competing here with Fairless, and still another mill in that area is absorbing up to $6 in freight.

Philadelphia—Although the Detroit and Weirton, W. Va., producers of hot and cold-rolled sheets are equalizing freight to this area with the Fairless, Pa., mill, midwestern producers generally are confining competition nearer home.

Cleveland—First quarter business is not coming in to the mills with the rush experienced in recent past years. Still, substantial volume has been booked and producers are confident the next few weeks will see a sharp pickup in ordering as manufacturing programs for first quarter round into shape. Consumers are cutting stocks.

Cincinnati—Warehouse stocks of most lines of sheets are filled. Stainless, coated, cold and hot-rolled, all appear to be in good supply. Large mills in this area continue to produce at a high rate of capacity while the smaller premium-price producers have cut production.

St. Louis—Sheet demand is strong with mills forecasting first quarter allotments to sales offices will be disposed of without difficulty.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 174

Chicago—The fine weather that prevailed this fall, allowing construction to proceed unimpeded, has placed a strain on reinforcing steel supply. There has been some working down of backlogs, and it appears large government jobs are nearing an end. Industrial work is declining and likely will continue to do so.

Los Angeles—Demand for reinforcing bars is brisk and supplies adequate. Limited quantities of foreign bars are reported on the market at less than domestic mill prices.

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Latest Information To Help Solve Your WELDING PROBLEMS

Send For Your Copy NOW

Right off the press! Our new CHAMPION WELDING Catalog describes the full line of CHAMPION Arc Welding Electrodes and Gas Welding Rods for all applications.

Here are 40 pages of vital information, answering welding questions which have been bothering you for a long time.

For CHAMPION performance you need a Champion electrode . . . why use ordinary electrodes when CHAMPIONS cost no more?

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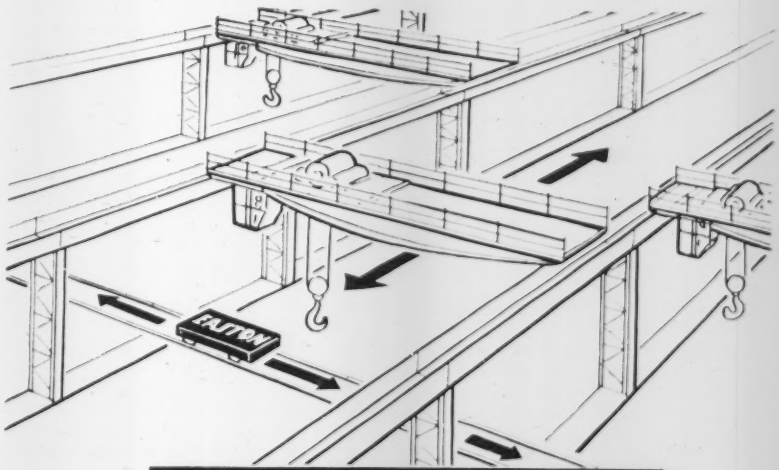
Automatic motor-driven transfer cars provide a universal handling system in modern parallel bay plants now served by overhead cranes. Also for transfer between plant buildings.



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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA. • NEW YORK • PHILADELPHIA • PITTSBURGH

Steel Bars . . .

Bar Prices, Page 174

Philadelphia Some leading sellers of hot-rolled carbon bars have little capacity left open for this quarter but district offices are turning down virtually no tonnage for this position without first checking with their mills. As for January, they still have space for considerably more tonnage and in most cases for a wide diversity of specifications. They will have little carryover at end of this year.

The Fairless, Pa., mill, getting under production this month on hot carbon bars, will have only a limited range to offer for a while. For January, this producer is offering rounds from ½ to 2 inches; squares, ½ to 1¼ inches; and flats, 1 to 4 inches in width and ¼ to 1 inch in thickness. No angles will be scheduled for deliver much before early spring.

Merritt-Chapman & Scott Corp., New York, construction engineer and marine salvager, plans purchase of the plant, properties and inventories of the Milton Electric Steel Corp., Milton, Pa. This latter company, subsidiary of the Harrisburg Steel Corp., Harrisburg, Pa., and until Sept. 1 this year known as the Boiardi Steel Corp., has annual ingot capacity of 53,700 net tons, and produces carbon and alloy steel bars, bar size shapes and reinforcing steel.

The Merritt-Chapman company proposes to expand operations at the Milton mill which it will operate as a division. About 20 per cent of the mill's production will be used by Merritt-Chapman in its construction activities. The remainder of the mill's output will be offered on the open market. In its construction and salvaging operations Merritt-Chapman generates a considerable tonnage of steel scrap which can be used in the Milton electric furnaces.

New York Leading producers of hot-rolled carbon bars have not begun to equalize with the Fairless, Pa., mill, partly for the reason they do not know what sizes Fairless will offer for first quarter. Consumers are moving slowly in placing first quarter orders.

Boston Carbon bar consumers are more price minded with freight equalization involved. Pressure is not against f.o.b. mill prices, but rather delivered costs with Buffalo and Morrisville, Pa., base key points. Depending on the area, and taking into account $3 per ton higher price at Morrisville, advantages vary. Fairless is lower in southern New England with Buffalo low in central and more northern districts, including Boston. Delivered prices under this current price range are slight.

Carbon bar buying for first quarter is slow, also alloys, although orders for nickel-chromium are heavier.

Pittsburgh The fall inventory readjustment has nearly been completed. Fabricators' stocks have been depleted to the point they are stepping up purchases.

Cleveland Consumers are not rushing to get on first quarter books like they were a year ago, but the bar mills report substantial bookings for the period and expectations are sufficient business will develop over coming weeks to assure high-level operations through first quarter. There is no question, however, that demand pressure is off, and that inventory conscious buyers are exercising a high degree of caution in placing forward delivery orders.

Chicago Bliss & Laughlin Inc., Harvey, Ill., has revised sales policy to permit absorption of sufficient transportation charges to meet lower delivered prices of competitors.

The revised sales policy became effective Nov. 10, and applies on shipments made from all plants of Bliss & Laughlin Inc., at Harvey, Ill.; Buffalo; Detroit; and Mansfield, Mass.

Handling: Small Production Parts Bench to Bench Without Trucking

THE ALLIED 2-28 CONVEYOR

A traveling, stock conveyor that carries diversified small work parts to and from points of operations. It goes here and there smoothly, tucked away in small spaces; passes work benches at proper level for discharging and receiving parts. It eliminates hand traveling and confusion of distributing parts to various, separated points of operation.

The 2-28 is an interesting conveyor and it steps up production. Ask us about it for your plant.

ALLIED STEEL AND CONVEYORS, INC.

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ALLIED DOES THE WHOLE JOB . . . FROM BEGINNING TO END!

Semifinished Steel . . .

Semifinished Prices, Page 174

Youngstown District steel operations are estimated at 96 per cent of capacity with 3 bessemers, 63 open hearths, and 21 blast furnaces engaged. Youngstown Sheet & Tube Co. placed back in operation one of the open hearths it took off recently.

Iron Ore . . .

Iron Ore Prices, Page 192

Cleveland A new all-time record season shipment of iron ore from upper lake ports was chalked up last week when cumulative shipments to Nov. 9, passed the 92,720,346-ton mark.

With several weeks of the lake shipping season remaining it is expected the season total will top the 95 million-ton mark easily. The record up to this year was set in 1942 when a total of 92,076,781 tons of ore were brought down the lakes.

Shipments in the latest week totaled 1,778,487 tons, which was about 838,173 tons under the movement in the like week a year ago. More than 50 lake carriers already have been taken out of service for this season.

Costs less to use!

As the industry's *highest* quality maintenance material, Permanente 84 keeps steel furnace bottoms in good operating condition with *less material* than usually required.

Thus, it actually *costs less* to use Permanente 84 than materials with a lower initial cost.

Leading steel producers report that Permanente 84, by lasting longer, helps cut down-time for maintenance and repair as much as 50%!

This means Permanente 84 makes possible more steel at lower cost per ton.

Order Permanente 84 now, and get that extra tonnage! It's your *best buy* for bottom, bank and tap hole maintenance. Also ideal for open hearth and electric furnace rebuilds.

For complete information contact principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California; First National Tower, Akron 8, Ohio.

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Basic Refractory Bricks and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

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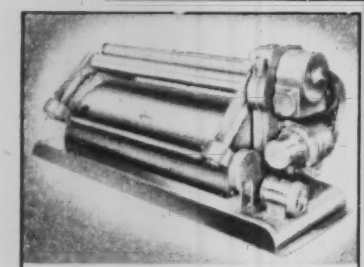

REED PLATE BENDING ROLLS

★ In 18 models, ranging from 3 ft. x 10 ga. to 8 ft. x ¼" in capacity
★ Rugged, all steel construction
★ Built-in, silent worm gear drive
★ Durable, special bronze bearings
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REED OFFSET FORMING MACHINE

★ Improves automatic welding production by eliminating chill-rings and backing bars
★ Forms offset weld-backing joggle from tank shell
★ Loosens rust and mill scale
★ Improves shell roundness
★ Two models: M-2—1/16 to 3/16" plate
M-4—3/16 to 7/16" plate

WE INVITE YOU . . . to write us for specifications, prices, list of REED users near you. No obligation. Just write on your letterhead.

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ORES—COKE—REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematite (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, min. 65%, WO_3, good commercial quality	$39-$40
Domestic scheelite, mine	63.00

Manganese Ore

Mn, 48% nearby, $1.18-$1.21 per long ton unit, c.i.f. U. S. ports, duty for buyers' account; shipments against old contracts for 48% ore are being received from some sources at 90-93c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.:

Indian and African			
48%	2.8:1		$40.00-$42.00
48%	3:1		44.00-46.00
48%	no ratio		32.00-34.00
South African Transvaal			
44%	no ratio		$27.00-$28.00
48%	no ratio		34.00-35.00
Brazilian			
44%	2.5:1	lump nom.	$32
Domestic			
		(Rail nearest seller)	
48%	3:1		$39.00

Molybdenum

Sulphide concentrate, per lb, Mb content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Oryiston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vanadalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $123; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° F.: Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent*: Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.
60 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.
70 *Per Cent*: St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.00
Chicago ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Buffalo, deld.	28.08
Flint, deld.	28.23
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44-45
Birmingham area	$49.50

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky.; net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

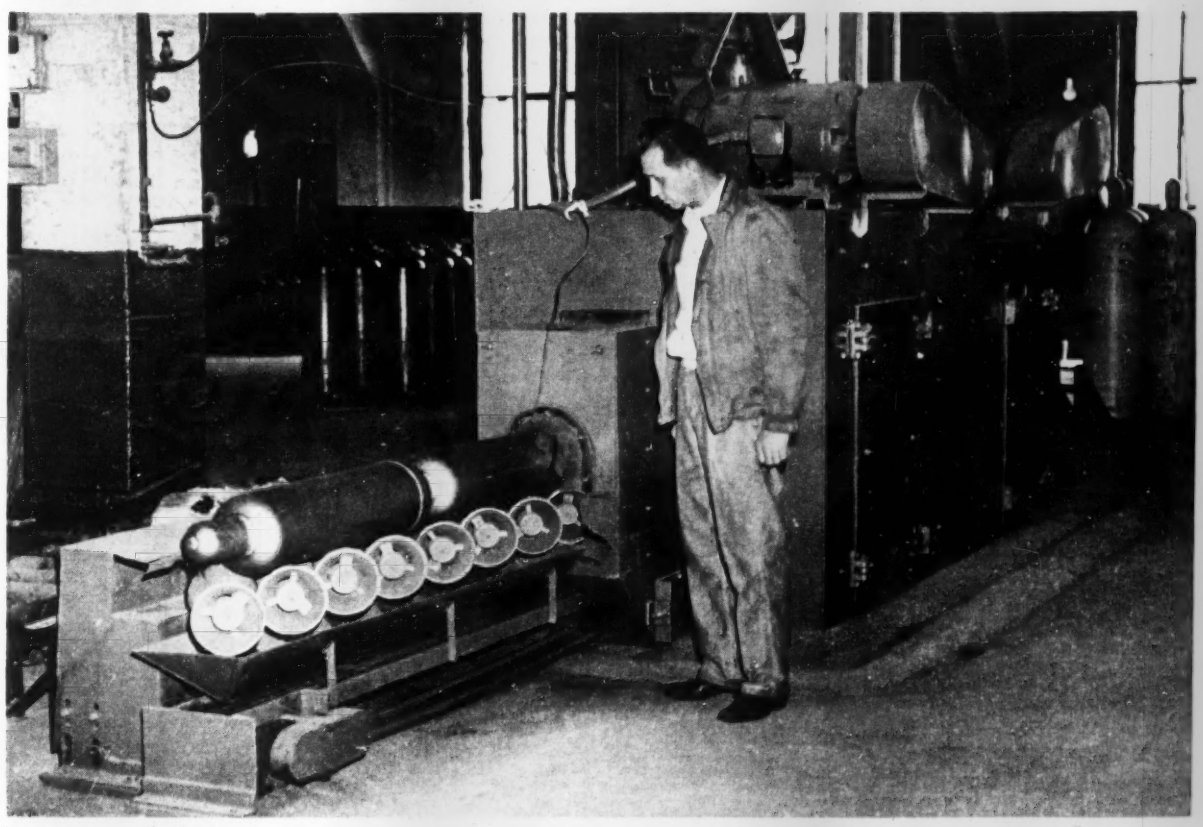
GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5⅛	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

pioneering developments keep **WHEELABRATOR**® *first in blast cleaning*



avalanche of steel shot cleans used cylinders one a minute

an example of the savings possible reconditioning used parts with a Wheelabrator

The time it takes to restore used parts to good-as-new condition is drastically cut by use of Wheelabrator Airless Blast Cleaning Equipment. For instance, it previously took 8 hours by manual wire brushing and airblasting to strip old paint and remove surface corrosion from just 16 compressed gas cylinders at Independent Engineering Co., O'Fallon, Illinois. Quality of cleaning was also unsatisfactory. The Wheelabrator Cabinet, illustrated above, now thoroughly and uniformly cleans these pieces at the rate of 60 per hour. Cleaning is continuous as the cylinders pass through the avalanche of steel shot thrown from the Wheelabrator blast units.

More and more used parts are being profitably reconditioned with the help of Wheelabrator blast cleaning. Old paint, rust, and other foreign materials are removed for a fraction of the cost of other methods to simplify reconditioning operations. The Wheelabrator's fast, thorough and low-cost cleaning creates new profit possibilities in the reconditioning of trade-ins and leased machinery, auto parts, electrical equipment, pipe, structural steel, valves and fittings, etc.

Time and cost savings can be demonstrated on your products in the Wheelabrator laboratory. There is no cost or obligation. Write now for details.

Bulletin 74-B tells "What the Wheelabrator is and what it Will Do For You." Send for a copy today.

American
WHEELABRATOR & EQUIPMENT CORP.
509 S. Byrkit St., Mishawaka, Ind.

Wheelabrator®
AIRLESS BLAST CLEANING

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200 Clairton, Top-ease, Johnstown and Sheridan, Pa.; Alloy W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala., and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti, less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.7c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c, less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-45%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.50c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr, 36-39%, Si 26-39%, Al 7-9%, C 0.05% max). 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.25 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump bulk, 12.40c per lb of contained Si, carload packed 14.6c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-45%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5/25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.6c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—Weighing approx. 2½ lb and containing exactly 1 lb. of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquetts: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.10 per lb of contained W; 2000 lb W to 10,000 lb W, $4.20, less than 2000 lb W, $4.32, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx.; and Cb and Ta 60% min, C 0.30% max); ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

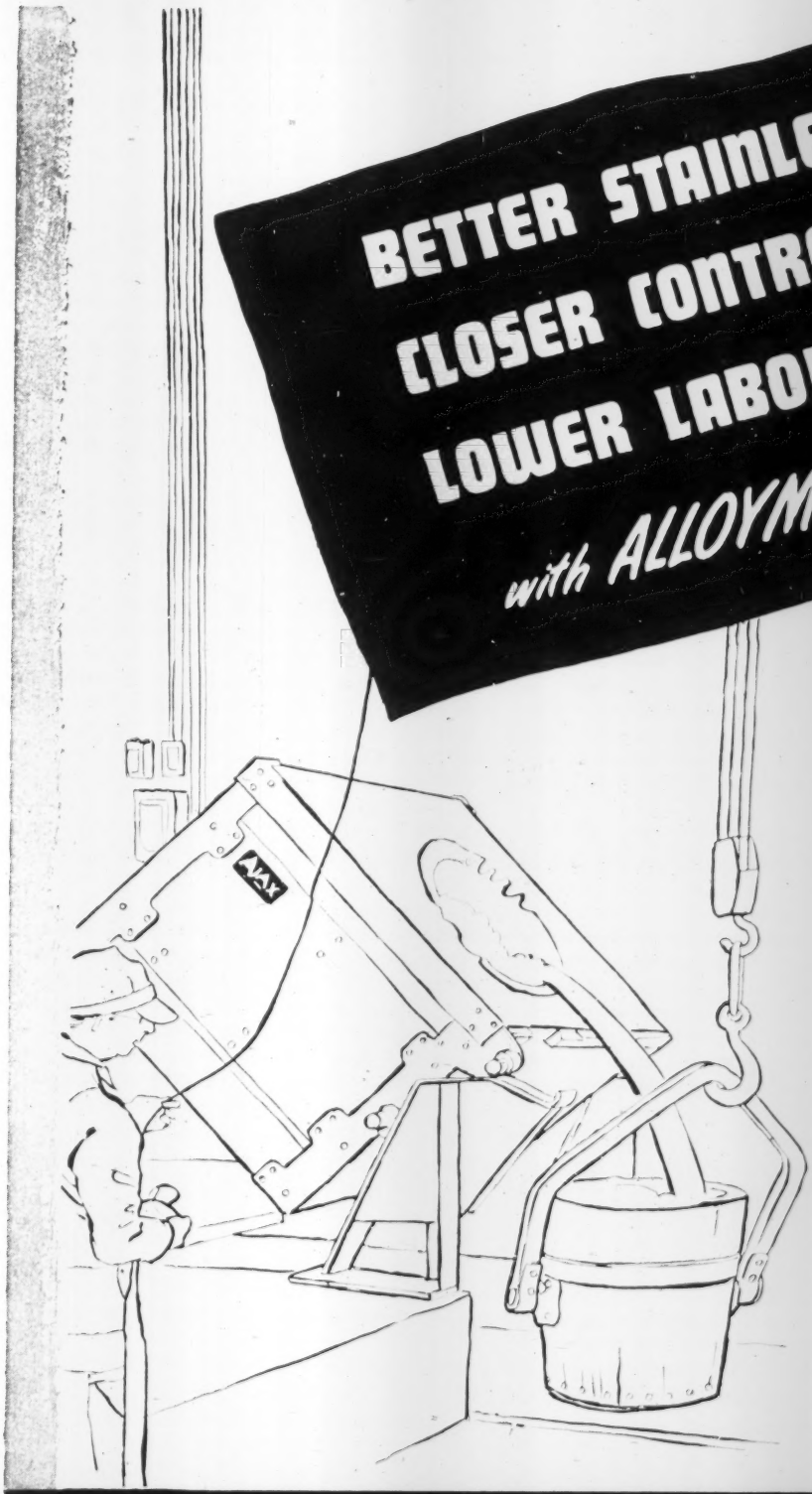
Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb. contained Mo, f.o.b Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

BETTER STAINLESS CLOSER CONTROL LOWER LABOR COSTS with ALLOYMET 2115



IN THE production of stainless steels, the trend is toward closer controls of analysis through the use of quality master alloy ingot. Our ALLOYMET 2115 ingot (70% Nickel—10% Chrome) is fast becoming the standard of the industry as a basic raw material in the production of stainless steels.

When ALLOYMET 2115 is used in the melt, the analysis of the finished product is never in doubt. Compare this with a heat of 18-8 scrap . . . but no, there is no comparison. Scrap—no matter how good it may be—is still an imperfect commodity that is generated; not made to order. ALLOYMET 2115, on the other hand, is a master alloy made to rigid specifications under the supervision of trained metallurgists who know the needs of the steel industry.

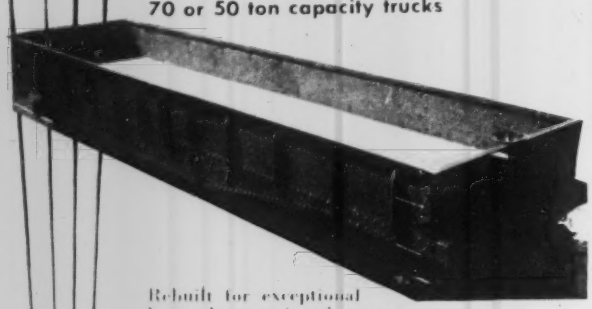
Steel producers are rapidly learning that to use master alloys in the place of scrap costs so very little more. Prove this by your own use.

ALTER COMPANY
Alloy Metal Division
1701 Rockingham Road, DAVENPORT, IOWA
Phone 6-2561 Teletype DV 588

Available!

HEAVY DUTY-MILL TYPE ALL STEEL GONDOLAS

furnished with either
70 or 50 ton capacity trucks



Rebuilt for exceptional heavy duty service, these cars are in excellent condition and can withstand severe abuse, particularly where clam shell buckets or magnetic cranes are used for loading and unloading.

Each car is reconstructed with an inside height of 2 feet 6 inches to reduce the possibility of overloading breakdowns. Whether used for railroad interchange, industrial service or mill type service, these cars will prove efficient and economical to operate.

CFC Gondola cars are reconditioned to include these special features:

- New welded steel liners up to ½" in thickness as specified by customer
- New steel sides and ends up to ⅜ in thickness as specified by customer
- New side and end top chord angles
- Double fish belly type center sills built of steel plate and angles 17" deep at body bolster to end sill and 24" deep at the center of the car. Center sills are continuous.
- Fish belly type side sills 24" deep at center of car
- AB, KC type or straight train line air brakes as specified.

Each car is put into first class operating condition by skilled workmen in Chicago Freight Car's own shops. Built in 1926, these gondola cars will give many years of rugged service. They are priced to give you exceptional values and are ready for prompt delivery.

GENERAL SPECIFICATIONS

Capacity, nominal	100,000 lbs.
Light weight, approx.	48,000 lbs.
Load limit	121,000 lbs.
Inside length	38 ft. 4 in.
Inside width	9 ft. 0 in.
Inside Height	2 ft. 6 in.
Length over strikers	40 ft. 6 in.

Write for specification sheet giving complete data.

CHICAGO FREIGHT CAR... *and parts company*

CHICAGO, ILL. AUBURN, WASH. PUEBLO, COLO.

MAIN OFFICE: 228 North LaSalle Street, Chicago 1, Illinois

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MOLINE "Hole-Hog" SPECIALLY DESIGNED MACHINE TOOLS

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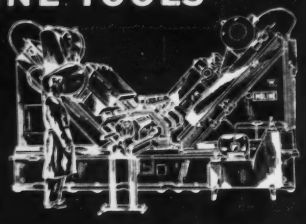

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Pig Iron . . .

Pig Iron Prices, Page 158

Chicago—The eased demand for foundry pig iron is reflected in further reductions in blast furnace operations. Only 37 of the district's 43 stacks are blowing.

St. Louis—Pig iron consumers' stocks are comfortable. Principal supplier here is able to build ground stocks substantially in anticipation of a projected furnace shutdown for relining.

Boston—Pig iron consumers are not building normal winter inventories due to restricted melts and the uncertain outlook for castings demand. Four-day week melting schedules are high for many shops.

New York—Pig iron buying lags. Some consumer stocks are low but replacement buying hasn't developed in volume. Users are ordering no more than is necessary until after Jan. 1.

Buffalo—Merchant pig iron demand is spotty but no easing in the market is reflected here.

Philadelphia—Easing of export regulations on pig iron and various other iron and steel products is not expected to have much bearing on the movement of iron here. Conditions abroad are not conducive to much foreign buying.

Pittsburgh—Two district blast furnaces are idle. Jones & Laughlin Steel Corp. idled one stack at its Pittsburgh Works while Bethlehem Steel Co. shut down one Johnstown, Pa., furnace. Merchant iron shipments remain slow.

Cleveland—Pig iron demand is relatively sluggish with foundries exercising caution as regards inventories. With iron in plentiful supply there is no urgency to cover needs far ahead. Nevertheless, merchant iron is moving steadily into consumption despite spotty foundry operations.

Scrap . . .

Scrap Prices, Page 200

Boston—Firmer prices for steel scrap are confined largely to heavy melting grades, No. 2 steel and bundles. Inclined to lag are turnings and lighter scrap. Steel scrap consumers in this area hold substantial inventories and new buying is not impressive.

New York—Trading in scrap has been slowed by a strike at a number of yards. Brokers' buying prices are unchanged, except for slight easing in machine shop turnings to a spread of $13.50 to $14.50.

Buffalo—Stronger under-current prevails in the scrap market here as the area's second largest mill consumer placed new orders for steelmaking grades at the higher prices posted a week ago. In addition, sentiment is bolstered by sales of cupola cast at $34 to $35.

Philadelphia—The steel scrap market is quiet with prices on major open-hearth grades unchanged. On mixed borings and turnings, however, prices have dropped to a range of $20.50 to $21, delivered consumer plant, and on heavy turnings to $31 to $31.50. Low phos structurals and plate have advanced to $38.50 and drop broken machinery to $42 to $43.

Pittsburgh—Growing market firmness here raised the price of No. 1 heavy melting to $37 to $38. Prices on other open hearth and cast iron grades remained level or increased only slightly. A sale of No. 1 railroad heavy melting scrap raised that price $3 a ton to $42 to $43.

Cleveland—While some dealers are talking higher prices, there is little in the scrap market picture at present to support the bullish views expressed. Consumer buying is at a virtual standstill in this area, and little tonnage is moving in the Valley. Recent buying appears to have added appreciably to mill inventories, which, coupled with sagging operations at certain steel plants, is resulting in some holding up of dealer shipments on contracts. In the absence of representative sales, current prices are unchanged, and largely nominal.

Cincinnati—Absence of local buying keeps the scrap market quiet. Metal continues to move out-of-town by barge and rail. This movement is expected to increase later this month.

Detroit—The flurry in automotive scrap prices created only a momentary flash in the local scrap market picture. Token sales indicate further softening in the market ahead though volume currently moving is insufficient to peg prices closely.

Chicago—Market undertone on the better grades of scrap is firm but price advances are resisted. It seems doubtful consumers will pay more until late in the month when a large consumer contracts for December supply. For some grades, brokers must pay consumer buying prices to complete orders. No. 2 bundles, on the other hand, are softer.

St. Louis—Something of a scrap price tug-of-war is seen developing between the railroads and the steel mills as result of refusal of two roads to accept bids on recent scrap offerings. The carriers allege the mills

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are seeking to force scrap prices down while withholding reductions in prices on new steel the railroads purchase.

Birmingham—Scrap dealers, aroused by railroad resistance to lower freight rates on scrap from the South to northern consuming points, are considering alternative methods of transportation, namely trucking and water shipments. Recently the Interstate Commerce Commission reversed the findings of an examiner recommending reduction of 15 per cent on a minimum carload of 75,000 pounds of scrap from southern territory to the North.

Los Angeles—Mill scrap buying is limited. With foundry backlogs reduced to 30 to 60 days from 60 to 90 days, melters are displaying little interest in adding to scrap stocks.

San Francisco—Scrap prices are holding in the face of light tonnage movement. Dealers are not adding much to yard stocks.

Seattle—The $2 rise in the price of heavy melting steel last week failed to generate a heavy volume of shipments. Receipts about equal consumption. Mills are watching export developments closely, cognizant of the fact that should a strong foreign demand develop prices in this area will rise.

Rails, Cars . . .

Track Material Prices, Page 177

New York—October car awards involved 1705 freight cars, reports the American Railway Car Institute and Association of American Railroads. Deliveries of new cars in October set a new high for 1953, totaling 8727 units.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4760 tons, New York state thruway, Rockland county, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

4000 tons, RCA building, erection on site of Center theater, Sixth Avenue, New York, through George A. Fuller Co., that city, to Ingalls Iron Works, Birmingham, Ala.

900 tons, Ogden Ave. grade separation over Congress St. expressway, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

800 tons, gypsum plant, Seattle, for Permanente Cement Co., to Isaacson Iron Works, Seattle.

510 tons, state highway bridge, Bergen City, N. J., through Grove Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

495 tons, state highway bridge, Westchester county, New York, through A. E. Ottoviano, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

425 tons, warehouse building, Follansbee Steel Corp., Wallingford, Conn., to New England Iron Works, New Haven.

345 tons, manufacturing plant, Jacoby-Bender Inc., Long Island City, N. Y., through Brown & Matthews Inc., to Bethlehem Contracting Co., Bethlehem, Pa.

320 tons, state bridge, Bronx county, New York, through William M. Moore Construction Co., and Loper Construction Corp., to Harris Structural Steel Co., New York.

265 tons, industrial building, Idlewild Enterprises Inc., Queens, New York, to Gold Seal Iron Works, that city.

250 tons, finance building, United Air Lines, Midway Airport, Chicago, to Mississippi Valley Structural Steel Co., Decatur, Ill.; Algot B. Larson Inc., Chicago, contractor.

250 tons, state bridge, Mercer county, New Jersey, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

220 tons, service building, Central Gas & Electric Co., Rockford, Ill.; Stone & Webster Engineering Corp., engineer.

140 tons, scales, Pennsylvania railroad, Conway, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

130 tons, flood light towers, Pennsylvania railroad, Conway, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

3500 tons, section, state expressway, Bronx, New York, Corbette Construction Co., New York City, low on general contract.

2500 tons, the Dalles dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., Dec. 22.

2430 tons, bridges, Ohio turnpike, Ottawa and Sandusky counties, Ohio; bids Dec. 1, Ohio Turnpike Commission, Columbus, O.

725 tons, angles, contracting officer, Air Force Depot, Topeka, Kans.; bids Nov. 20; also 735 tons, low carbon annealed hot or cold-rolled sheets.

550 tons, four state bridges, Needham-Wellesley, Mass.; M. De Matteo Construction Co., Quincy, Mass., low.

475 tons, bridges, ramps and completion of South End bridge, contract C, Agawam-Springfield, Mass.; Daniel O'Connell & Sons Co., Holyoke, Mass., low.

450 tons, state bridges, Brockton-West Bridgewater, Mass., section, Fall river expressway; bids Nov. 17, Boston.

150 tons, John S. Baker public school; bids to Tacoma, Wash., soon.

REINFORCING BARS . . .

REINFORCING BARS PLACED

150 tons, Renton, Wash., junior high school, to J. D. English Steel Co., Tacoma, Wash.; Anderson Construction Co., Tacoma, general contractor, $247,910.

100 tons, addition, Sick's brewery, Seattle, to Soule Steel Co., Seattle.

100 tons, addition, grain elevator, Port of Seattle, to Joseph T. Ryerson & Son Inc., Seattle; Scheumann & Johnson, Seattle, general contractors, $219,900.

REINFORCING BARS PENDING

17,000 tons, also anchor bolts, the Dalles dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., Dec. 22.

1625 tons, state highway and bridges, Ohio turnpike, Ottawa and Sandusky counties, Ohio; bids Dec. 1, Ohio Turnpike Commission, Columbus, O.; also 245,000 square feet, 10-inch reinforced concrete pavement.

200 tons, 392-ft. bridge near Gardiner, Oreg.; general contract to Tom Lillebo, Reedsport, Oreg., low $134,015; by Bureau of Public Roads.

150 tons, Garden State Parkway, contract No. 50, sec. 1, Bergen county, New Jersey, bids Nov. 30.

PLATES . . .

PLATES PLACED

2000 tons, 10 tanks, Texas Co., New York, for erection at Bethlehem, N. Y., to Chicago Bridge & Iron Works, Chicago.

400 tons, 15,000 feet, 36 and 24-inch concrete lined steel pipe, So. 166th St., line, Seattle, to American Pipe & Construction Co., Portland, Oreg.; general contract to Thorburn & Lagoze, Seattle, low $226,934.

100 tons plus, 3-million gallon water reservoir, steel roof, to American Pipe & Construction Co., Portland, Oreg., low $77,325; pipe connections to P. S. Lord, Portland, Oreg., low $122,962.

PLATES PENDING

2850 tons, sheet piling, government furnished, the Dalles dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., Dec. 22.

500 tons, three-million gallon standpipe, Winchester, Va.; bids in.

(Please Turn to Page 202)

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IRON AND STEEL SCRAP

Consumer prices per gross ton, except as otherwise noted, including broker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Nov. 12	$35.33
Nov. 5	35.00
Oct. avg.	32.75
Nov. 1952	43.00
Nov. 1948	43.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*$7.00-$8.00*
No. 2 heavy melting	*$7.00-$8.00*
No. 1 bundles	*$7.00-$8.00*
No. 2 bundles	*$4.00-$7.00*
No. 1 busheling	*$7.00-$8.00*
Machine shop turnings	21.00-22.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	25.00-26.00
Cast iron borings	24.00-25.00
Cut structurals	40.00-41.00
Heavy turnings	31.00-32.00
Punchings & plate scrap	40.00-41.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	*$8.00-$9.00*
Charging box cast	38.00-39.00
Heavy breakable cast	36.00-37.00
Unstripped motor blocks	33.00-34.00
No. 1 machinery cast	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	*$7.00-$8.00*
Rails, 2 ft, and under	*$6.00-$7.00*
Rails, 18-in. and under	41.00-42.00
Rails, random lengths	44.00-45.00
Railroad specialties	*$7.00-$8.00*

Stainless Steel Scrap

18-8 bundles & solids	**165-170**
18-8 turnings	**90-95**
430 bundles & solids	**87-90**
430 turnings	**60-62**

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	33.00-34.00
No. 2 bundles	27.00-28.00
No. 1 busheling	33.00-34.00
Machine shop turnings	18.00-19.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	34.00-35.00
Alloy free, short shovel turnings	25.00-26.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	41.00-44.00
Charging box cast	31.00-32.00
Stove plate	38.00-39.00
Heavy breakable cast	27.00-28.00
Unstripped motor blocks	26.00-27.00
†Brake shoes	37.00-38.00
Clean auto cast	46.00-47.00
No. 1 wheels	41.00-42.00
Burnt cast	31.00-32.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	36.00-37.00
R.R. malleable	45.00-46.00
Rails, 3-ft. and under	50.00-51.00
Rails, 18 in. and under	50.00-51.00
Rails, random lengths	43.00-44.00
Cast steel	42.00-43.00
Railroad specialties	42.00-43.00
Uncut tires	40.00-41.00
Angles, splice bars	45.00-46.00
Rails, rerolling	49.00-50.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	nom. 50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	35.00-36.00
No. 2 bundles	32.00-33.00
Machine shop turnings	17.00-18.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Low phos.	36.00-37.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt	37.00-38.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	35.00
No. 2 bundles	30.00
No. 1 busheling	35.00
Electric furnace bundles	36.00-37.00
Machine shop turnings	22.00
Mixed borings, turnings	*20.50-21.00*
Short shovel turnings	28.00
Structurals & plate	*38.50*
Heavy turnings	*$1.00-$1.50*
Couplers, springs, wheels	42.00
Rail crops, 2 ft & under	46.00-48.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Charging box cast	nom.
Heavy breakable cast	40.00
Unstripped motor blocks	28.00
Drop broken machinery	*42.00-43.00*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	22.50-23.50
Machine shop turnings	*$1.50-$1.50*
Mixed borings, short turnings	18.00-19.00
Low phos. (structural & plate)	29.50
Short shovel turnings	19.00-20.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00

Stainless Steel

18-8 sheets, clips solids	165.00-175.00
18-8 borings, turnings	85.00-90.00
430 sheets, clips, solids	80.00-85.00
410 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	*23.00-23.50*
No. 1 bundles	24.00-25.00
No. 2 bundles	*20.50-21.50*
Machine shop turnings	*13.00-13.50*
Mixed borings, turnings	*18.50-19.00*
Short shovel turnings	*16.50-17.00*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	36.00-37.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	25.00-26.00
No. 1 busheling	33.00-34.00
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	19.00-20.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos. 18-in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	*$8.00*
Heavy breakable cast	35.00
Charging box cast	35.00
Drop broken machinery	46.00

Railroad Scrap

No. 1 R.R. heavy melt	34.00-35.00
Malleable	42.00-43.00
Rails, 18-in. and under	48.00-49.00
Rails, random lengths	39.00-40.00

CHICAGO

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles	32.00-34.00
No. 2 bundles	26.00-27.00
No. 1 busheling	33.00-34.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3-ft	37.00-38.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	*$8.00-$9.00*
Stove plate	*29.00-30.00*
Unstripped motor blocks	19.00-20.00
Clean auto cast	36.00-38.00
Drop broken machinery	36.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00-36.00
R.R. Malleable	40.00-41.00
Rails, 2-ft. and under	46.00-47.00
Rails, 18-in. and under	48.00-49.00
Angles, splice bars	40.00-42.00
Rails, rerolling	44.00-46.00

Stainless Steel Scrap

18-8 clips & solids	140.00-160.00
18-8 turnings	nom. 70.00
430 clips & solids	70.00
430 turnings	45.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.00
No. 2 heavy melting	23.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 1 busheling	29.00
Machine shop turnings	14.00
Mixed borings turnings	14.00
Short shovel turnings	15.00
Punchings & plate scrap	30.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Stove plate	34.00-35.00
Heavy breakable	29.00-30.00
Unstripped motor blocks	30.00
Clean auto cast	40.00
Malleable	40.00

BUFFALO

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	31.00-31.50
No. 1 bundles	34.00-35.00
No. 2 bundles	29.00-29.50
No. 1 busheling	34.00-35.00
Machine shop turnings	21.50-22.50
Mixed borings, turnings	23.50-24.00
Short shovel turnings	24.50-25.00
Cast iron borings	23.50-24.00
Low phos.	38.00-39.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*$4.00-$5.00*
No. 1 machinery	39.00-40.00

Railroad Scrap

Rails, random lengths	41.00-42.00
Rails, 2 ft and under	46.00-47.00
Railroad specialties	44.00-45.00

BIRMINGHAM

No. 1 heavy melting	26.00-26.50
No. 2 heavy melting	24.00-24.50
No. 1 bundles	26.00-26.50
No. 2 bundles	22.00-22.50
Machine shop turnings	19.50-20.50
Short shovel turnings	20.50-21.50
Cast iron borings	20.50-21.50
Cut structurals	nom.
Electric furnace bundles	nom.

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	41.00-42.50
Charging box cast	30.00-31.00
Stove plate	38.00-39.00
Bar crops and plate	38.00-39.00
Cut structurals	36.00-37.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt	nom.
Rails, 2-ft and under	42.00-43.00
Rails, random lengths	39.00-40.00
Angles, splice bars	38.00-39.00
Rails, rerolling	46.00-47.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*$5.00*
No. 2 heavy melting	29.00-30.00
No. 1 bundles	*$5.00*
No. 2 bundles	27.00-28.00
Machine shop turnings	*14.00-15.00*
Short shovel turnings	*15.00*

Cast Iron Grades

No. 1 cupola	*$8.00-39.00*
Charging box cast	29.00-30.00
Heavy breakable cast	*$1.00-32.00*
Unstripped motor blocks	*29.00-30.00*
Brake shoes	*$7.00-38.00*
Clean auto cast	*$9.00-40.00*
Burnt cast	*$1.00-32.00*

Railroad Scrap

Malleable	37.00-38.00
Rails, 18 in. and under	*47.00-48.00*
Rails, random lengths	*41.00-42.00*
Rails, rerolling	*48.00-49.00*
Uncut tires	33.00-34.00
Angles, splice bars	*$7.00-38.00*

SEATTLE

(delivered consumer plant)

No. 1 heavy melting	31.00
No. 2 heavy melting	27.00
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 3 bundles	15.00
Machine shop turnings	12.00-12.50
Mixed borings, turnings	12.00-12.50
Short shovel turnings	12.00-12.50
Electric furnace, No. 1	36.00-38.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00-30.00
Unstripped motor blocks	27.00
No. 1 wheels	38.00-40.00
Stove plate	29.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
No. 1 busheling	24.00
Machine shop turnings	7.00
Mixed borings, turnings	7.00
Short shovel turnings	11.00
Cast iron borings	11.00
Cut structurals	28.00
Heavy turnings	11.00
Punchings & plate scrap	28.00
Electric furnace bundles	22.00

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Machine shop turnings	7.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	40.00-41.00

HAMILTON, ONT.

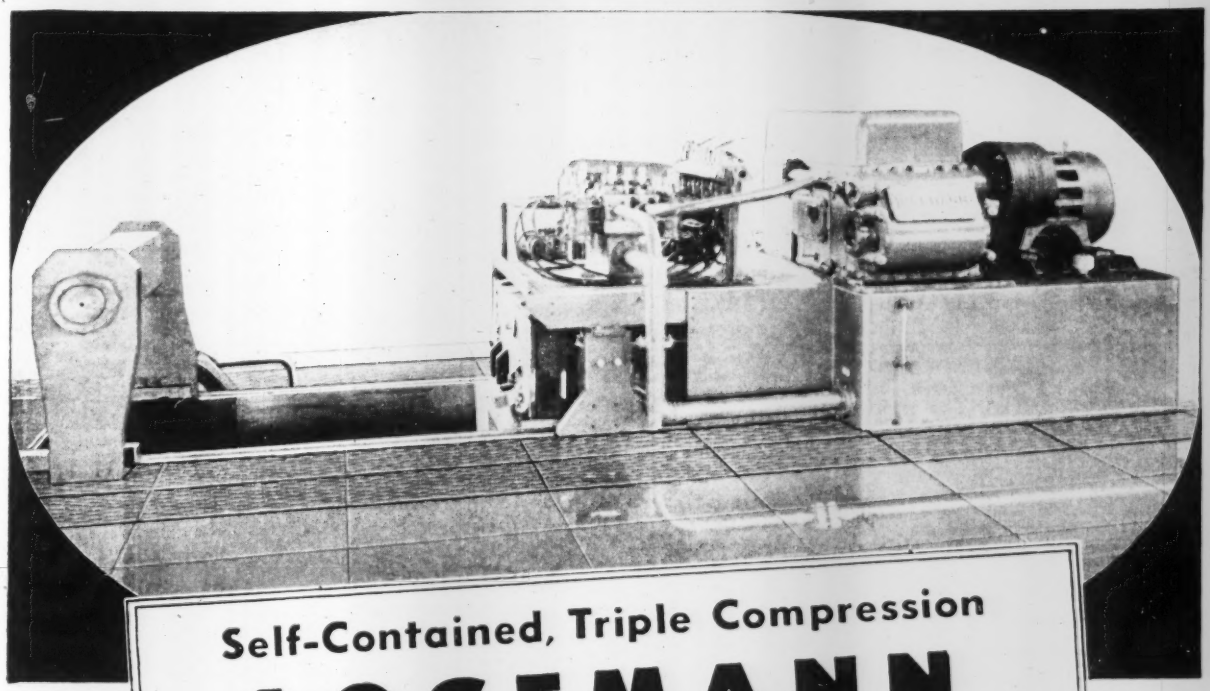
(Delivered prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.50
Mechanical bundles	28.50
Mixed steel scrap	28.50
Mixed borings, turnings	22.50
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	22.50

Cast Iron Gradest

No. 1 machinery cast	46.00

†F.o.b., shipping point.



Self-Contained, Triple Compression

LOGEMANN SCRAP PRESSES

. . . give you compact, high density bales . . . at low cost!

LOGEMANN

Also specializes in

WASTE PAPER BALERS

for Industrial Applications

and in

HIGH PRESSURE PUMPS

. . . for pressures from 2000 to 50,000 p.s.i. for press operation, hydrostatic tests, and similar applications.

You Conserve Floor Space and Piping with this Compact Installation

Here is a combination of tried and tested units expertly assembled to reduce floor space requirements to a minimum. Features include a big box, high speed operation, and high density bales. Various box sizes are available to meet maximum scrap and minimum bale dimensions.

Also available are various sizes and types of pumps and operating valves to meet output requirements. Logemann Scrap Presses can be equipped with loading hopper in which the scrap charge can be prepared while the press is going through the operations on the preceding bale. Compressed bales are delivered at floor level for ejection to conveyor, steel chute, or into accumulation pit.

Write for Complete Details

LOGEMANN BROTHERS CO.

3126 W. BURLEIGH STREET • MILWAUKEE 10, WISCONSIN

SHIMS

ONLY

"SHIM HEADQUARTERS"

OFFERS YOU ALL 5 TYPES

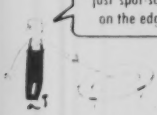
"looks like solid metal!"

THE LAMINUM® SHIM

SIMPLY PEELS FOR ADJUSTMENT

Made up of from 3 to 63 layers of .002 or .003 inch brass or steel, metallically bonded together over their entire surfaces. No dirt between layers. Peels with penknife.

"just spot-soldered on the edges"

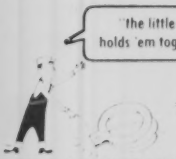


THE LAMISOL® SHIM

FOR QUICK, ASSEMBLY LINE USE

The laminations of the LAMISOL® Shim (in brass only) are temporarily joined by spot-soldering on the edges. Gauges and number of laminations within one shim are unlimited.

"the little tab holds 'em together"

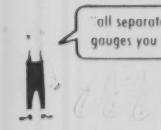


THE LAMITAB® SHIM

FOR SUPER SPEED, THIN GAUGE SITUATIONS

The little tab holds shim laminations together firmly, yet is easily removed. Different metals can be used in the same shim.

"all separate, any gauges you want"



THE LOOSE LEAF SHIM

FOR UNLIMITED FLEXIBILITY

This is the simplest of all custom-stamped shims. It is completely flexible. Usually sets including several different gauges are made up.

"swell for hand cutting simple shims"

PACKAGED SHIM STOCK

READY FOR EASY USE, WITHOUT WASTE

Thin gauge 6" x 100" rolls feed through package slots. Heavier gauges in flat envelopes. Available from your Industrial Distributor.

*T.M. Applied For

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LAMINATED SHIM COMPANY, INC.

3411 UNION STREET GLENBROOK, CONN.

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250 tons, steel plate, the Dalles dam; bids to U. S. Engineer, Portland, Oreg., Dec. 22.

100 tons plus, disposal tanks, Hanford Works; bids to Atomic Energy Commission, Richland, Wash., Dec. 2.

PIPE . . .

CAST IRON PIPE PENDING

100 tons, 8000-feet 8, 6 and 4-inch and fittings; bids to Anita Busch, city clerk, Edmonds, Wash., Dec. 1.

STEEL PIPE PENDING

200 tons, the Dalles dam, Columbia river; bids to U. S. Engineer, Portland, Oreg., Dec. 22.

RAILS, CARS . . .

RAILS PLACED

New York Central, 79,500 tons, with 40,700 tons, of which 4700 tons are for the Pittsburgh & Lake Erie subsidiary, to U. S. Steel Corp., Pittsburgh; 30,000 tons to Bethlehem Steel Co., Bethlehem, Pa.; 5100 tons to Inland Steel Co., Chicago; and 3100 tons to Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont., accessories not yet placed.

CLASSIFIED

Help Wanted

TECHNICAL MEN—A progressive specialty steel company located in the East is organizing a Research and Development Laboratory and needs several competent Junior and Senior technical men capable of filling responsible positions. Write Box 840, STEEL, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR FORGE SHOP MAINTENANCE FOREMAN

Experienced in maintenance of light and heavy machines for up-to-date Plant making Drop & Upset Forgings up to 100 lbs. each. Have own Die Shop and Heat Treating Plant. No product machining—employ 250 men. Wonderful opportunity for experienced Master Mechanic who is capable of handling Labor Relations. We also have opening for an experienced Die Room Foreman. Mail details of your experience, etc., promptly to Box 854, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Qualified by proven record covering twenty years practical experience. Engineering Degree Massachusetts Institute Technology, supplemented with training in accounting, costs and industrial engineering. Reply Box 845, STEEL, Penton Building, Cleveland 13, Ohio.

AGGRESSIVE SALES ENGINEER seeking affiliated steel producing line in State of Ohio. Four years experience industrial sales. Write Box 858, STEEL, Penton Bldg., Cleveland 13, Ohio.

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MANUFACTURERS REPRESENTATIVE in Ohio Valley steel-coal belt can handle additional lines of heavy equipment, power tools and expendible materials, with on-spot engineering services. Facilities for display and warehousing if necessary. Write Box 847, STEEL, Penton Building, Cleveland 13, Ohio.

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Are you properly represented in Texas? An alert, aggressive manufacturers representative calling on industrial OEM and user accounts needs additional line. Must supplement present top quality lines. Mechanical engineer eight years sales and engineering experience in industrial Chicago and Texas. Finest references. Write Box 856, STEEL, Penton Bldg., Cleveland 13, Ohio.

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SALARIED POSITIONS $3,500 TO $35,000. WE offer the original personal employment service established 43 years. Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 110 Dun Bldg., Buffalo 2, N. Y.

RAILROAD EQUIPMENT—*FOR SALE*

USED **AS IS** **RECONDITIONED**

STANDARD GAUGE FREIGHT CARS

Box, Steel Sheathed, 40-Ton Capacity

Box, Double Sheathed, 50-Ton Capacity

Box, Single Sheathed, 50-Ton Capacity

Flat, 50-Ton, Steel Underframe, 40'6" Long

Gondolas, Composite, or All Steel 50-Ton and 70-Ton

Hoppers, Twin, All-Steel, 50-Ton, Cross Dump

Ore Hoppers, All-Steel, 50-Ton, Heavy Duty

Tank, 3,000-Gallon, High Pressure

Tank, 8,000-Gallon, Coiled and Non-Coiled

Hoppers, All Steel, 70-ton, Triple Hopper Cross Dump

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

CABOOSE CARS

Eight Wheel, Cupola Type

STANDARD GAUGE AIR DUMP CARS

Side Dump, 20-Yd., 40-Ton, Lift Door

End Dump, 20-Yd., 50-Ton, Drop Door

Side Dump, 30-YD., 50-TON, DROP DOOR

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Jordan Spreader

Locomotive Cranes

Overhead Cranes

Railroad Track Scales

ONE ALCO STANDARD GAUGE DIESEL-ELECTRIC LOCOMOTIVE

100-TON, 600 H.P., TYPE 0-4-4-0

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For
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6,000 Gallon
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10,000 Gallon

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All types of steel, steel products, plumbing supplies, brass goods, etc., for distribution to dealers in the Florida area.

Write Harry Markowitz, Inc.
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10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order

EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

RELAY RAILS
AND ACCESSORIES

Largest Inventory on Pacific Coast

DULIEN STEEL PRODUCTS, INC.
OF WASHINGTON

P. O. Box 3386 **Seattle 14, Wash.**

GENERAL SUPERINTENDENT

Opportunity in 150-man Steel Fabricating Plant and Warehouse. Graduate engineer with experience in production and factory management.

Reply to
THE PATERSON-LEITCH COMPANY
900 East 96th St. **Cleveland 3, Ohio**

Contract Manufacturing Facilities Available For

CUSTOM-BUILT
MEDIUM and HEAVY
MACHINERY

Steel Fabricating Shop—Grey Iron Foundry
Pattern Shop—Machine Shop

OPEN TIME NOW

Quality Workmanship—Prompt Service
Engineering Service Available
For Complete Information, Write, Wire or Phone
ROBERT HOLMES & BROS. INC.
2-B Junction Ave., Danville, Illinois

FOR SALE
2500 KVA TRANSFORMER
WITH TAP CHANGER

Oil-insulated, water-cooled Westinghouse Transformer designed for electric steel furnace operations. Indoor type, 3-phase, 60 cycle, primary 13,200 V. Separate GE Reactor with hand operated tap changer gives secondary voltages on YY connection of 96, 104, 112, 122, 125, 134, 153, 172; on ΔY of 166, 179, 193, 211, 217, 239, 265 and 288V. Complete with 1800 gallons oil. Both units A-1 operating condition, guaranteed to pass standard NEMA tests.

Box No. 857, STEEL
Penton Building **Cleveland 13, Ohio**

WANTED

Sales Representative and Sales Engineer, preferably under 40 years old, to handle exclusively a well established line of Wire Products sold to Industries in Philadelphia and surrounding areas. Products well known in territory, with many active accounts developed from aggressive selling and advertising during past 15 years. Compensation earned by generous commission formula. Applicant should state age, education, full details of part business and selling experience, what automobile is available and facts about family and residence.

Reply Box 846, STEEL
Penton Building **Cleveland 13, Ohio**

WANTED

Turning Work For 44" x 25'

Lathes and 2–24" Bullard V.T.L.'s

Phone or Write:

Turnmetal Corporation

6025 Belfield Avenue

Philadelphia 44, Pa.

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from any angle

STROM *is your* **BEST BALL BUY**

If you have a metal ball problem, why not let Strom solve it for you. Whether for precision ball bearings or for one of many other ball applications . . . Strom will supply the *right* ball to meet your requirements. For more than a quarter century, industry has looked to Strom for metal balls of unsurpassed quality.

Strom

Largest Independent and Exclusive Metal Ball Manufacturer

1850 So. 54th Ave., Cicero 50, Ill.

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FARVAL SPRAY VALVES save 95% of lubricant and do 100% better job

FARVAL—*Studies in Centralized Lubrication*
No. 149

COUNT the number of open gears on your machines. Multiply the amount of grease required for these gears by 95% and you'll have the savings in lubricant alone which Farval Spray Valves can bring.

Even more important than lubricant saving, the Farval Spray Valve spreads and maintains a uniform thin film of oil or grease evenly over all bearing areas—eliminates friction, increases efficiency, lowers power costs, reduces wear.

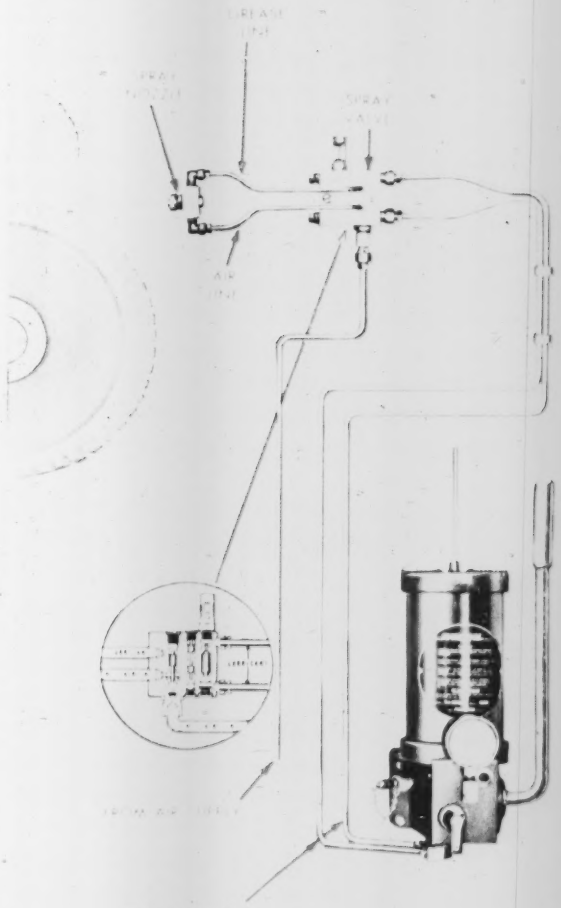
The Farval Spray Valve System is designed especially for lubricating open gearing and slide surfaces. Using an adaptation of the familiar Dualine Valve, this system sprays oil or grease from nozzles in just the right amount and at any desired interval.

No more wasteful hand paddling of lubricant on gear teeth with the hope it will spread itself uniformly. No more blobs of grease splotching up the floor—creating safety hazards. The Farval Spray Valve System has proved it can maintain a clean, even film of lubricant at all times while machines are in operation. No waste. No mess. No trouble.

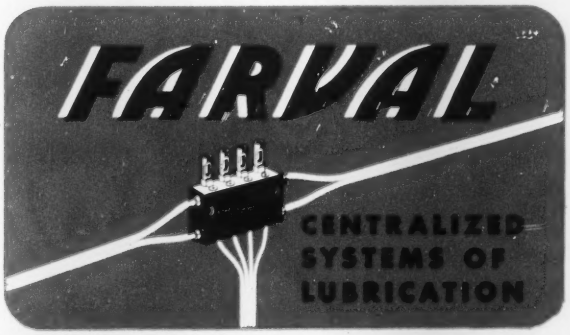
Farval Spray Valves can be inserted in a regular Farval Dualine System wherever compressed air is available. Or a complete Farval Spray Valve System may be installed, consisting only of Spray Valves served by a manual or automatic pumping unit. As indicated in the sketch at right, compressed air is directed through the Spray Valve, which meters air to the delivery nozzle at the same time that the lubricant is metered. Positive cut-off after delivery eliminates bleeding.

Why not insure that your open gearing and slide surfaces get the lubrication they need? Write for a copy of Farval Spray Valve Bulletin No. 60 today. The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



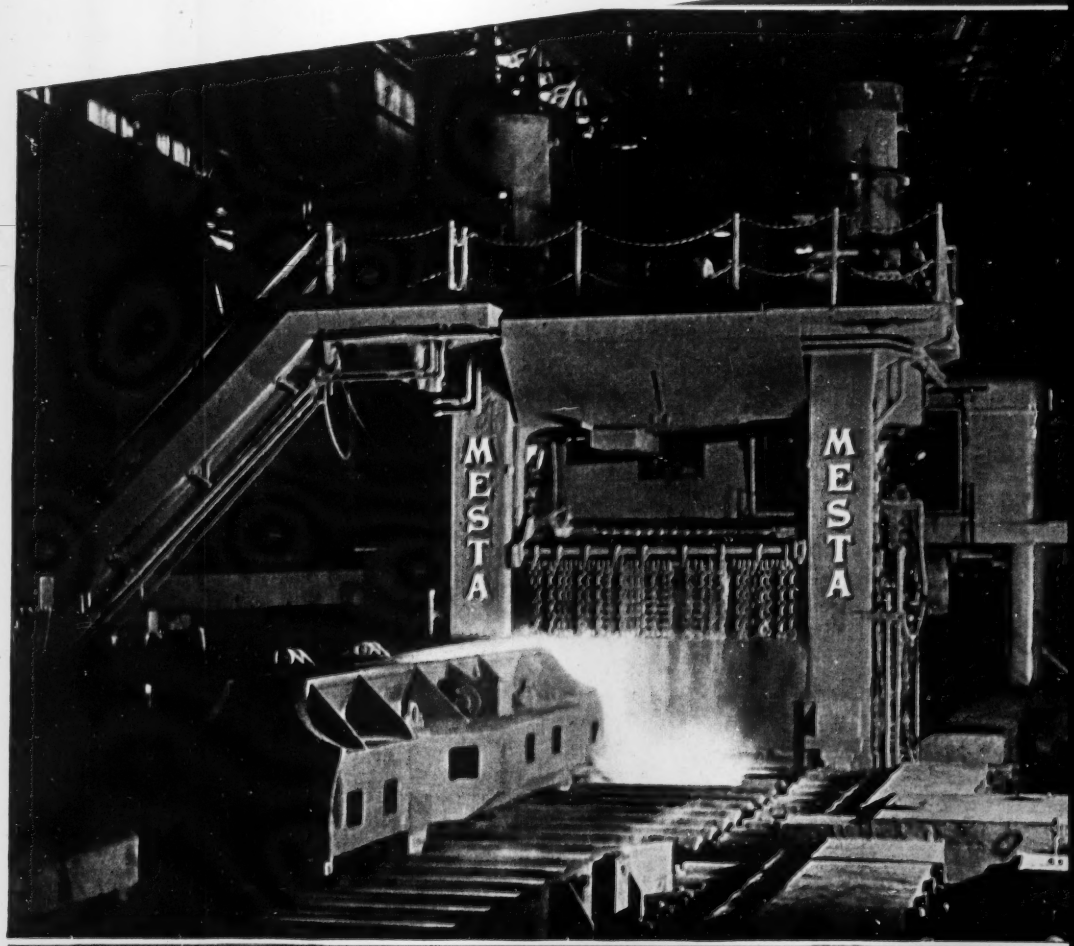
Drawing shows component parts of the Farval Spray Valve Centralized System of Lubrication—manual pumping station, dual lubricant lines, compressed air line, single Spray Valve and nozzle. Both automatic and manual systems installed three years ago are in operation today, prolonging gear life, saving labor and lubricant.



Modern Reversing Slabbing-Blooming Mills

Designed and Built by

MESTA



MESTA 46" Reversing Slabbing-Blooming Mill
Installed at the Pittsburgh Works of the Jones and Laughlin Steel Corporation

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY, Pittsburgh, Pa.

MACHINE TOOL

BUYERS' GUIDE

SECTION

AND REPORT ON MACHINE TOOLS AND TOOLING

This Guide and Report is designed to accomplish three objectives. It gives you for the first time an easy method for determining the sources for more than 20,000 types and sizes of machine tools. It tells you about the trends in machine tools and tooling as reported to STEEL by 2104 users of machine tools. And, the advertising pages provide you with additional information about the equipment, accessories and supplies made by various manufacturers. Complete contents are listed on page 1.

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Section Two

A SPECIAL REPORT BY THE EDITORS OF STEEL PENTON BUILDING • CLEVELAND 13

November 16, 1953

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VOLUME 133, Number 20—November 16, 1953

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The Survey....

The Machine Tool Survey is a study of trends in machining capacity, methods, tooling and machine tools. It reveals the preferences of buyers on machine tool features. It checks the types of machine tools in use and expected purchases. It canvasses users' thinking on amortization and replacement programs.

The Survey reflects the practices and thinking of 2104 companies who responded to STEEL's detailed questionnaire. The replies provide an ample cross section of the 14,334 metalworking plants which perform machining operations.

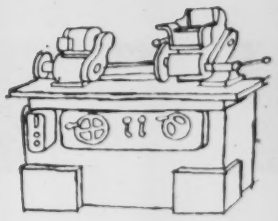
The questionnaire is supplemented by field interviews by STEEL's editorial staff with both users and builders of machine tools.

To metalworking companies performing machining operations the Survey provides a means of measuring your policies and practices against those of your competitors and contemporaries.

Only companies employing 20 or more people are included in the Survey. While the companies employing more than 20 account for less than half the total number of metalworking plants, they represent more than 96 per cent of the industry's total employment and the industry's total dollar volume of business.

To enable close comparisons among companies of like size the Survey results are presented by employment groups as well as for the industry as a whole. The ample cross section obtained provides adequate samples for such comparisons.

The Guide....



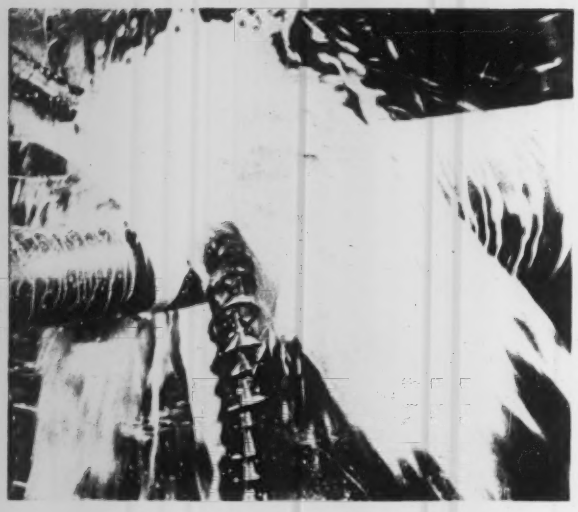
The Guide for Machine Tool Buyers is another in a series of reference works prepared for the readers of STEEL. Others include the Guide for Carbon Steel Buyers, the Guide for Stainless Steel Buyers and the Guide for Tool Steel Buyers.

Preparation of the Machine Tool Guide involved months of preliminary planning and testing to find out just what reference information would be helpful to machine tool users in selecting the equipment needed for a specific machining job.

Directories and catalogs were available but nowhere were there lists classifying machine tools by type, size, and manufacturer. Checks with machine tool users and builders indicated that this type of information would be most useful.

There followed an exhaustive search for all of the machine tool builders in the United States. This research brought forth nearly 600 companies, of which more than 10 per cent later proved to be out of business or no longer making machine tools.

As an indication of the size of the job, the individual listings of the companies represented in the Guide as recorded on cards filled boxes measuring several feet in length. The monumental task of classifying, checking and double-checking more than 21,000 entries now has been completed and is presented in this volume for your use. Every effort has been made to make it accurate and complete.



MACHINING CAPACITY

MACHINE TOOL users will increase their machining capacity by nearly one-quarter by 1960. From 1953 to 1954 they are lifting machining capacity by 12 per cent.

The 14,334 metalworking plants performing machining operations now are operating 2,397,000 machine tools. Planned increases in capacity will raise the total machine tools in operation to nearly 3 million by 1960.

Geographically, machining plants are scattered over 47 states and the District of Columbia. The greatest concentration of machine tool users is in New York, Illinois, Ohio, Pennsylvania, Michigan and California. Those six states account for approximately 60 per cent of all plants in the United States doing machining.

Watching for Improvements—Machine tool users are on the alert for more efficient tools and improvements. Three out of five expect to attend the contemplated National Machine Tool Show in Chicago in 1955 to see what the builders have to offer.

Most interested in new models and exerting the most buying influence will be (listed in order) the presidents, superintendents, works managers, vice presidents, general managers and purchasing agents of the companies performing machining operations. Large numbers of chief engineers, foremen, tool engineers and master mechanics also exert influence in machine tool buying and many will attend the machine tool show.

Those are some of the facts disclosed by STEEL's Machine Tool Survey. The study is based on direct reports from 2104 machine tool users. All users have 20 or more employees.

Capacity To Increase—Seven out of eight companies expect to increase their machining capacity during the next six years. Anticipated increases are remarkably uniform through all sizes of plants.

Only two per cent of the companies responding expect their machining capacity to decrease. Twelve per cent indicate no change is anticipated.

About three out of five companies expect to raise their machining capacity by between 10 and 25 per cent by 1960. Nearly one-fourth see an increase of between 25 and 50 per cent. A handful expects the increase will be greater than 50 per cent.

23% NET INCREASE IN MACHINING CAPACITY EXPECTED BY 1960

In Plants Employing:	Less than 10% Increase	10-25% Increase	25-50% Increase	50% or More Increase
20-49	13.4%	57.4%	24.0%	5.2%
50-99	17.1%	56.7%	23.8%	2.8%
100-249	13.9%	59.6%	23.3%	3.2%
250-499	11.6%	59.9%	24.6%	3.9%
500-999	7.3%	69.8%	20.8%	2.1%
1000 or more	12.0%	66.6%	17.6%	4.4%

Up 23% by 1960

Estimates Conservative—Many companies indicate their estimates of machining capacity increases are on the conservative side. Some say they list only those increases which now are actually planned, that further increases before 1960 are probable. Many point out their expansion will continue just as long as business conditions justify.

Still others indicate they will step up their purchases of new machine tools when and if taxes are lowered. Expiration of the excess profits tax, expected Dec. 31, will encourage some expansion.

Scores cite amortization regulations are a governor on new equipment purchases. More favorable amortization rules would be followed by an increase in new tool purchases.

Who Influences Buying—Machine tools are purchased not by individuals but by management teams. Often a half dozen or more people have a voice in the decision to buy.

No. 1 influence in the buying decision rests with the company president, with the superintendent a close second.

The president's influence in the purchase of tools diminishes as the size of the company increases. For example, 73 per cent of machine tool users in the 50-to-99 employee class list the president as a prime buying influence. Only 24 per cent of the companies employing more than 1000 list the president as a buying influence.

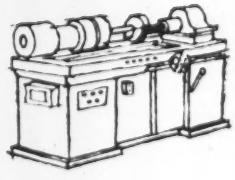
Influence of the superintendent and works manager, substantial in the smaller companies, increases with company size.

Tool engineers, foremen, and master mechanics are cited by few smaller companies as influencing machine tool purchases. In many smaller companies, of course, such titles do not exist. Among the larger machine tool users, these men exert more important buying influence. For example, the tool engineer is cited as a decisive influence in only 8 per cent of the companies employing 50 to 99, but is cited by 48 per cent of the companies employing more than 1000.

Purchasing agents exercise a substantial buying influence throughout the range of companies, being cited by 28 per cent of the 50-to-90 employee companies and by 39 per cent of the largest firms.

On to Chicago—Larger companies will send more

MACHINE TOOLS IN USE



In Plants Employing:	Number of Machines	Average Per Plant	Total Plants
20-49	247,039	46	5369
50-99	211,164	71	2973
100-249	314,769	117	2681
250-499	281,536	193	1458
500-999	350,016	377	929
1000 or more	992,784	1074	924

WHERE MACHINING

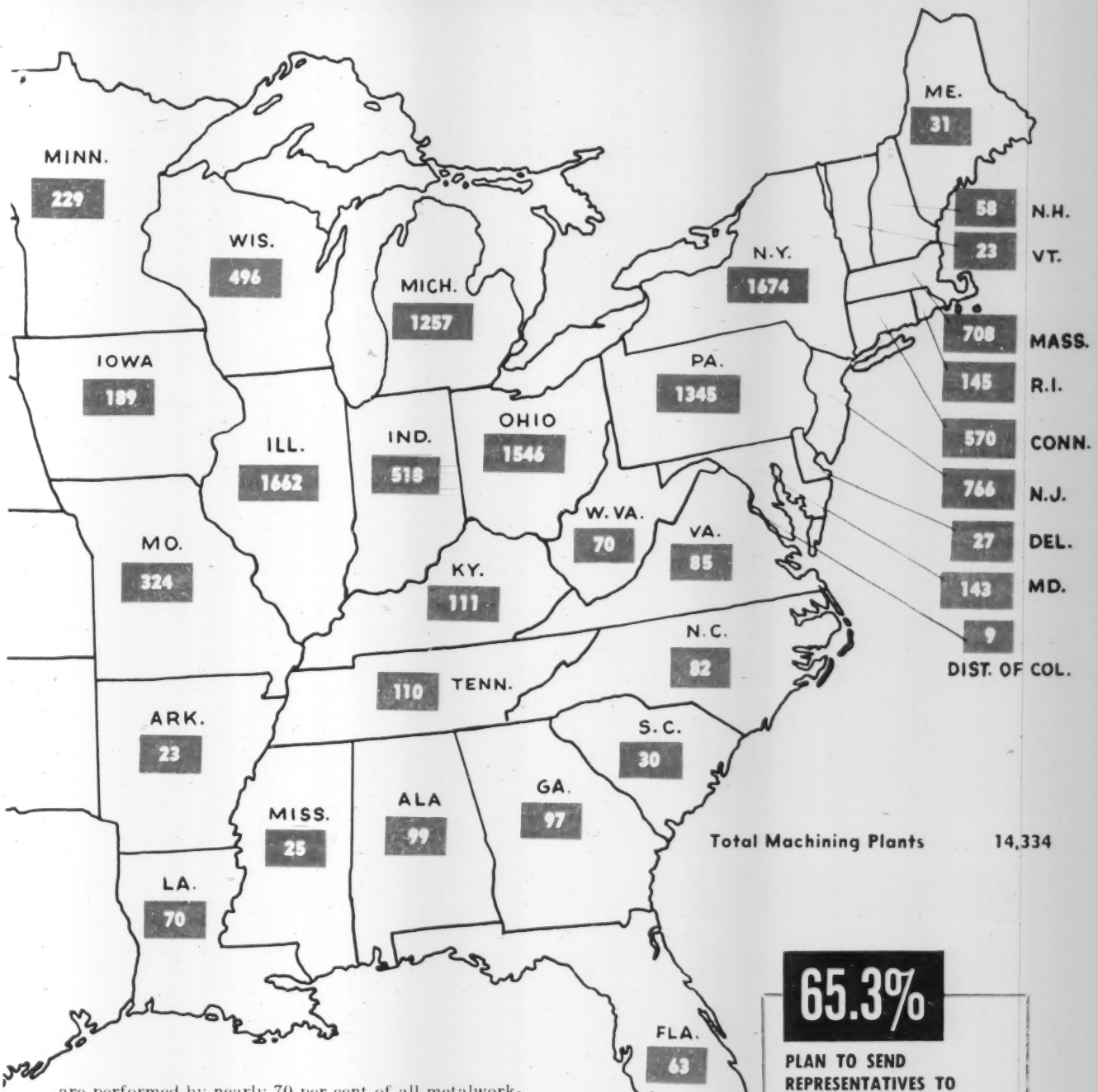
WHO DECIDES MACHINE TOOL PURCHASES?

(All plants employing more than 20)	
President	56.7%
Superintendent	54.2%
Works Manager	39.3%
Vice President	37.4%
General Manager	35.9%
Purchasing Agent	30.8%
Chief Engineer	26.1%
Foreman	25.2%
Tool Engineer	21.6%
Master Mechanic	14.8%
Treasurer	11.2%
Secretary	4.3%
Machine Operator	2.2%

representatives to the National Machine Tool Show in Chicago than will the small companies. Half the smallest companies surveyed—those in the 20-to-49 employees bracket—will have men at the show. Nine out of ten of the largest companies will be represented. Among the intermediate classes, representatives will attend from 77 per cent of the 500-to-999 employee group; from 69 per cent of the 250-to-499 employee group; from 62 per cent of the 100-to-249 employee group; and 52 per cent of the 50-to-99 employee bracket.

Most Prevalent Operation—Machining operations

PLANTS ARE LOCATED



Total Machining Plants 14,334

are performed by nearly 70 per cent of all metalworking plants throughout the United States. Machining is easily the most frequent operation in metalworking plants and exceeds even assembly operations.

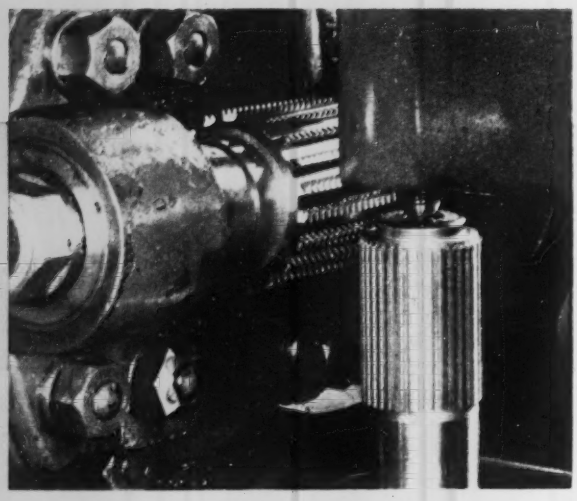
New York state leads in number of machining plants with 1674. Illinois is a close second with 1662 and Ohio is third with 1546. In fourth place is Pennsylvania, followed by Michigan, California, New Jersey, Massachusetts, Connecticut and Indiana.

The geographical distribution of machining plants closely parallels the distribution of all metalworking plants.

65.3%

PLAN TO SEND REPRESENTATIVES TO 1955 NATIONAL MACHINE TOOL SHOW

In Plants Employing:	
20-49	50.3%
50-99	52.3%
100-249	62.0%
250-499	69.3%
500-999	77.2%
1000 or more	90.0%



Machine

ADEQUATE machine tool replacement programs are major but unresolved problems for a majority of companies covered by STEEL's survey.

More than three-fourths of the companies say they have no planned replacement programs. Even among the largest companies (1000 or more employees), less than half have planned replacement programs.

Comments by the companies indicate they recognize the need for planned replacement programs, but point out difficulties in setting up such programs. Difficulties most frequently mentioned are: 1. Heavy tax burden which leaves insufficient funds to purchase new equipment; 2. Long amortization periods; 3. Inflation which makes the cost of new equipment several times greater than the cost of the original machines.

Set Asides—Fewer than half the companies covered set aside funds for purchase of new tools in addition to the usual allowances for depreciation. Large companies tend to set aside funds more frequently than do the smaller companies.

MAPI—Only three of ten companies say they are familiar with the MAPI (Machinery & Allied Products Institute) formula of re-equipment. The MAPI formula is used by 28.3 per cent of the companies who are familiar with it; 49 per cent expect to use it.

Larger companies are more familiar with the MAPI formula, are using it or expect to use it than are the smaller companies.

Amortization—Four or five companies would like the option of selecting their own amortization periods for writing off machine tools. If they were permitted to select their own amortization period, the most favored period would be 10 years. Sixty per cent would choose a period from 8 to 12 years, while 26 per cent prefer a 3 to 7-year amortization period.

Renting—Fourteen per cent of the plants surveyed are now renting machine tools. Renting is more popular among the large users than the smaller companies. More than 20 per cent of plants employing more than 1000 rent tools, compared with 6 per cent in the 20 to 49 employee group.

Leasing or renting of tools, while not a new device, has become more popular recently as taxes and the shortages of capital have become impressed on more companies. The advantages cited by companies renting tools are: 1. Lower capital requirements; 2. possible tax advantages; and 3. avoidance of uncertainty as to future need for tools.

Companies not renting tools fail to show any great interest in the proposal. Fewer than 12 per cent say they are interested. Small and medium-size plants are generally more interested in the proposal for the future than are the larger plants. Comments indicate the relatively low interest may be due to expectations that the tax burden (at least excess profits tax) will be lightened and that liberalization in amortization and depreciation regulations may be forthcoming.

14.0% Now Rent Some Machine Tools . . .

11.9% ARE INTERESTED IN RENTING

In Plants Employing:	Now Rent	Are Interested	In Plants Employing:	Now Rent	Are Interested
20-49	6.3%	12.6%	250-499	16.9%	11.2%
50-99	8.8%	10.2%	500-999	18.9%	11.3%
100-249	15.5%	14.9%	1000 or more	20.6%	8.3%

Tool Replacement

23.1% Have a Planned Replacement Program . . .

In Plants Employing:			
20-49	11.6%	250-499	21.9%
50-99	15.1%	500-999	37.2%
100-249	18.2%	1000 or more	47.7%

45.4% Set Aside Funds for Machine Tools . . .

(In addition to usual allowances for depreciation)

In Plants Employing:			
20-49	33.6%	250-499	48.9%
50-99	39.5%	500-999	58.3%
100-249	38.3%	1000 or more	67.9%

30.7% Are Familiar with MAPI* Formula . . .

28.3% of those familiar with it Have Used It.

49.8% of those familiar with it Expect to Use It.

In Plants Employing:	Familiar With MAPI	And Have Used It	And Expect to Use It
20-49	16.9%	5.3%	28.6%
50-99	18.3%	13.3%	37.2%
100-249	27.1%	15.6%	46.6%
250-499	32.6%	34.5%	60.0%
500-999	39.7%	39.5%	57.7%
1000 or more	58.0%	42.1%	52.2%

*Machinery & Allied Products Institute

78.9% Want Option of Selecting Amortization Period . . .

1.8% Do not want option.

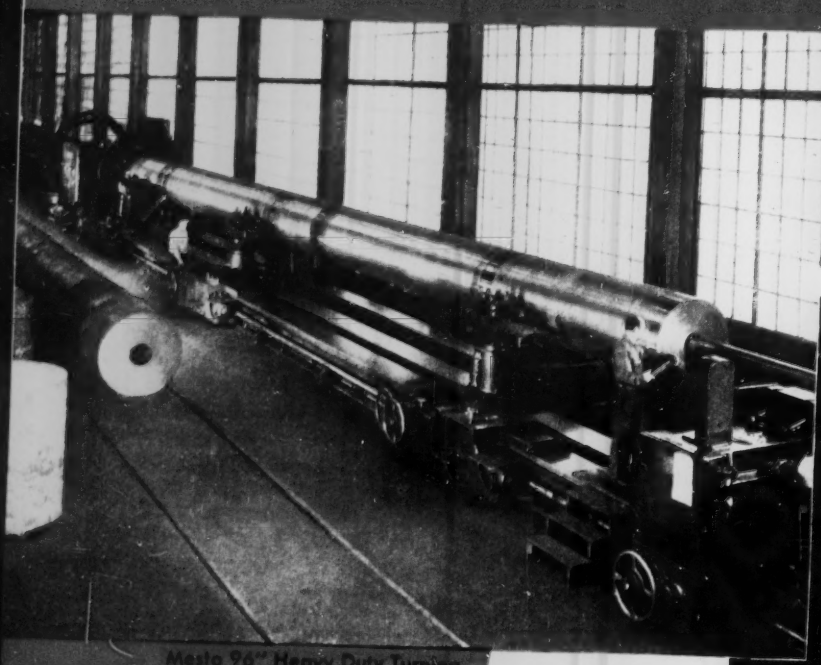
19.3% Have no preference.

In Plants Employing	Want Option	Do Not	No Preference
20-49	73.4%	1.7%	24.9%
50-99	79.6%	1.1%	19.3%
100-249	78.1%	3.3%	18.6%
250-499	77.8%	2.1%	20.1%
500-999	76.7%	0.9%	22.4%
1000 or more	85.8%	1.0%	13.2%

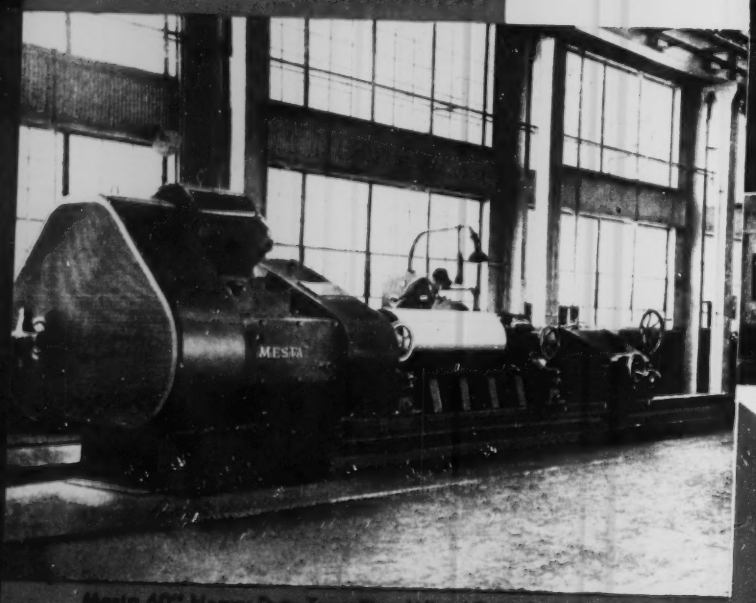
AMORTIZATION PERIOD PREFERRED?

Under 3 years	1.5%
3 - 7 years	26.0%
8 - 12 years	59.9%
13 - 17 years	8.3%
18 years or over	4.3%
	100.0%

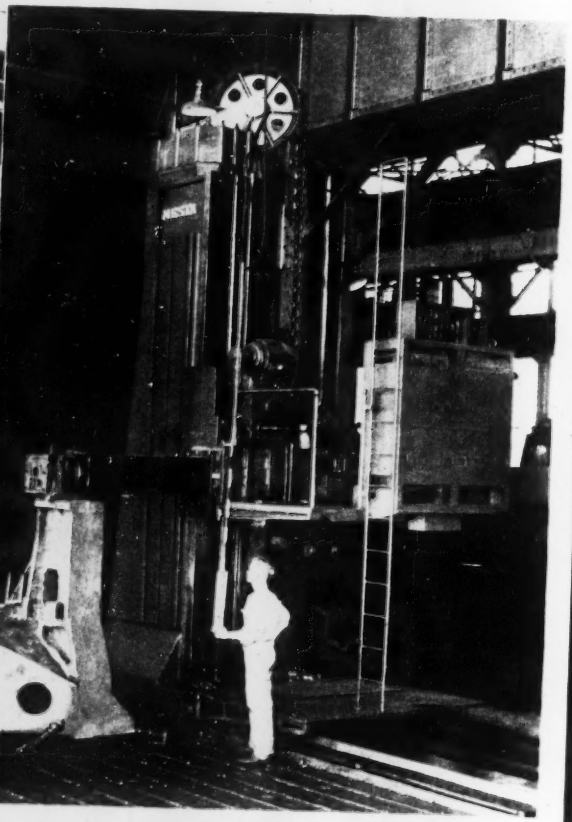
HEAVY DUTY MACHINE TOOLS



Mesta 96" Heavy Duty Turning and Boring Lathe



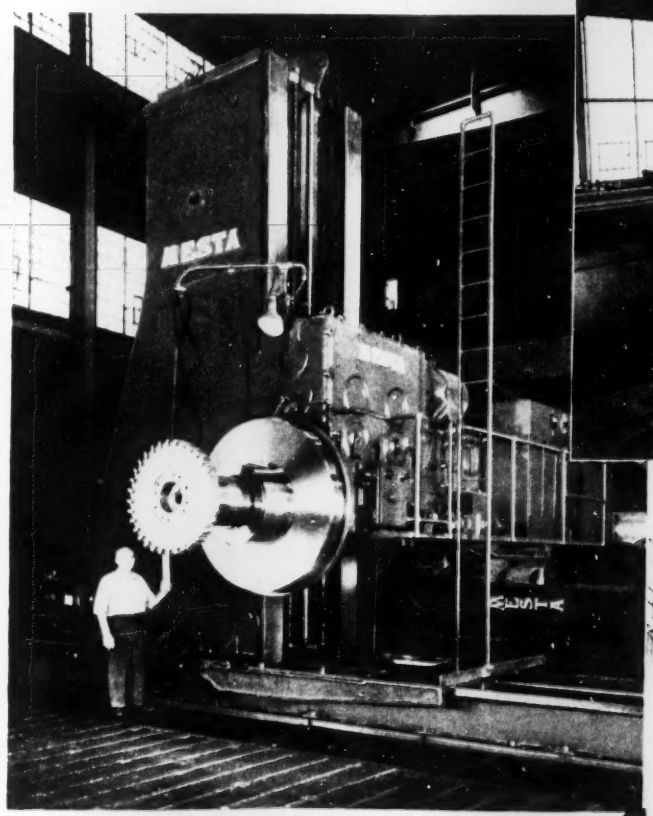
Mesta 60" Heavy Duty Travelling Wheel Type Roll Grinder



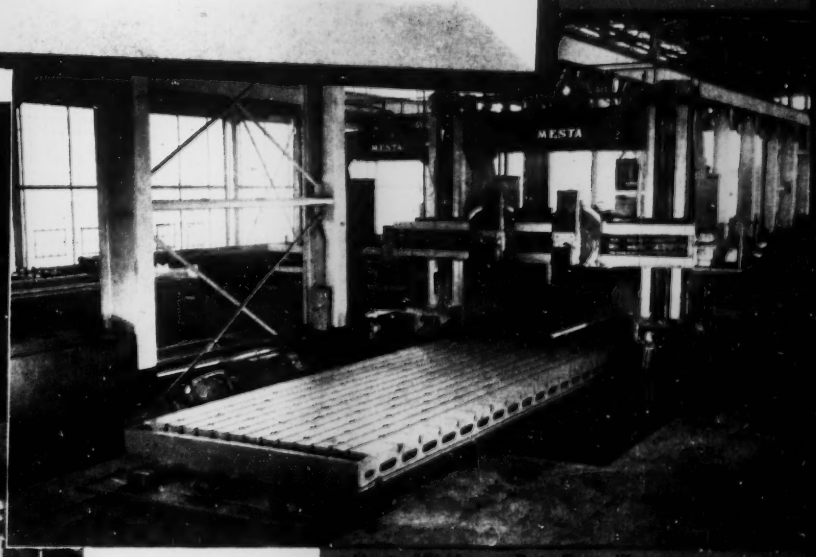
Mesta 120" Heavy Duty Draw-Cut Shaper

Designers and Builders of Heavy Duty Machine Tools and Complete Steel Plants . . .

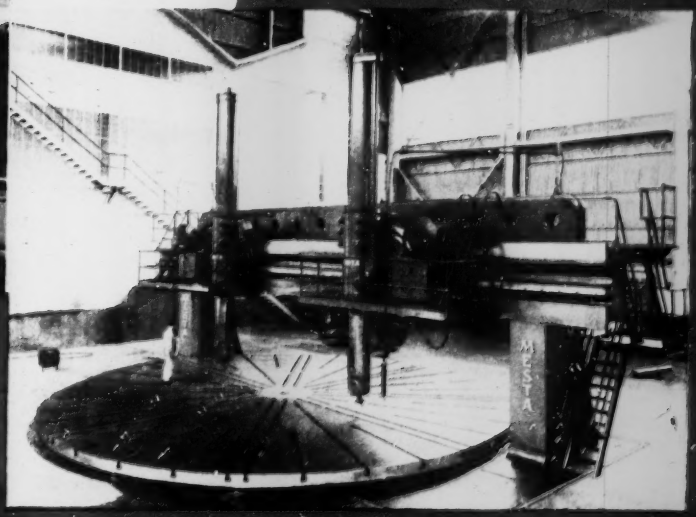
Designed and Built by MESTA



Mesta 18" Horizontal Boring, Drilling and Milling Machine



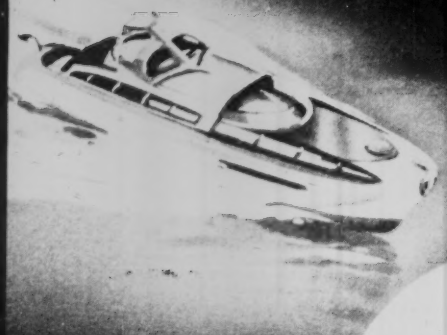
Mesta 15' Heavy Duty Travelling Table Type Planer

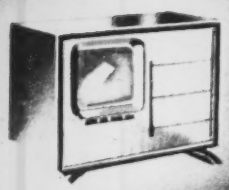


Mesta 48" Vertical boring Mill

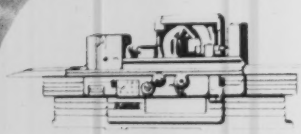
MESTA quality and precision in Heavy Duty Machine Tools, custom built for specific requirements.

MESTA MACHINE CO., Pittsburgh, Pa.

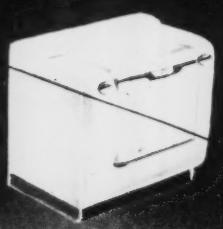


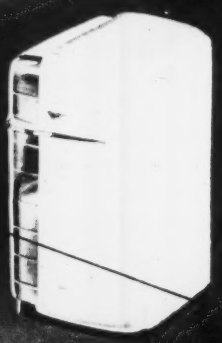


TWO-WAY PRECISION
BORING MACHINE



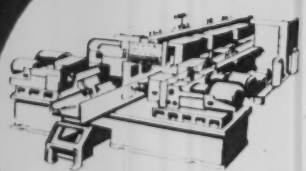
PRECISION
THREAD GRINDER



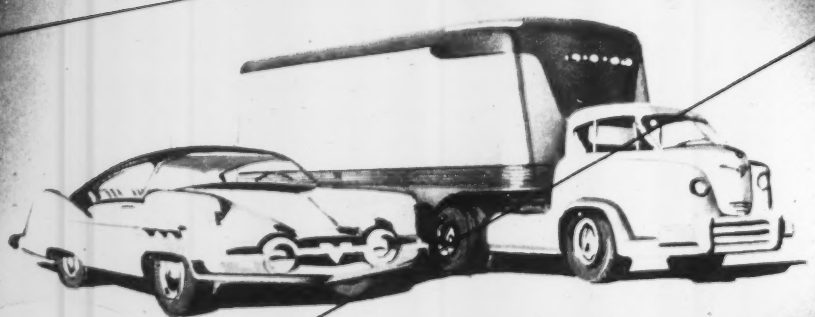


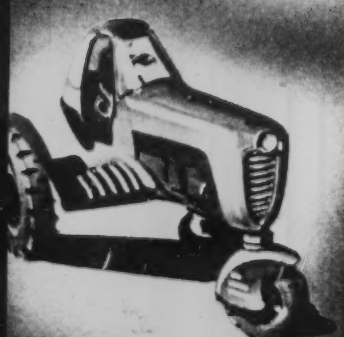
Designed and Built for Production of Tomorrow

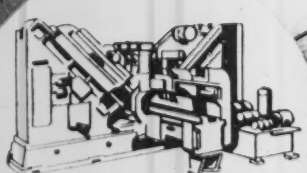
by EX-CELL-O



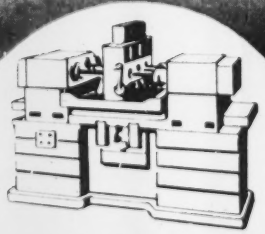
SPECIAL TRANSFER
MACHINE







ANGULAR
PRECISION CYLINDER
BORING MACHINE



PRECISION
BORING MACHINE

EX-CELL-O *Precision*
MACHINE TOOLS

BORING MACHINES

• **Horizontal** • **Vertical** • **Cylinder** • **Way Type**...A complete line of machines for precision boring, turning, facing and grooving operations in volume production or toolroom work.

THREAD GRINDERS

• **External** • **Internal** • **Universal** . . . Machines for toolroom and production grinding of threads, worms, taps, gages and other forms.

JET BLADE FINISHING MACHINES

• **Surface Form Grinder** • **Two-Wheel Form Grinder** • **Profile Miller** • **Profile Grinder** • **Profile Polisher** . . . Machines for grinding the root forms and for milling, grinding and polishing the airfoil forms of jet engine blades and buckets.

SPECIAL MACHINES

• **Verticals** • **Horizontals** • **Transfer Machines** . . . Single-purpose, high-production machines for drilling, reaming, spotfacing, counterboring, precision boring and facing operations.

VERTICAL CONTOURING MACHINE

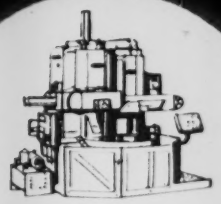
A production machine for tracer-controlled contouring and for precision boring, turning, facing, rabbetting and grooving of large round parts such as jet engine rotor disks and frames.

* * *

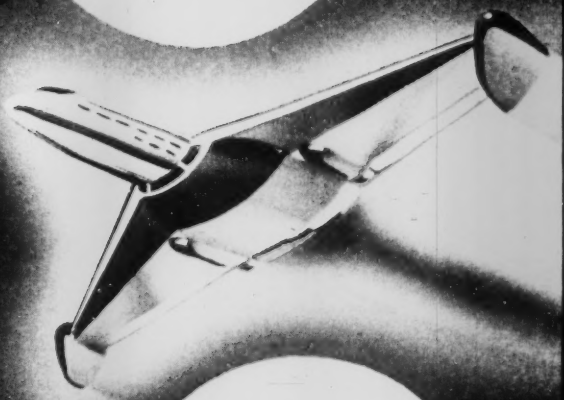
Ex-Cell-O also manufactures tool grinders • center lapping machines • grinding spindles • hydraulic power units • cutting tools and broaches • drill jig bushings • precision aircraft and miscellaneous parts and assemblies • railroad parts and equipment • dairy equipment.

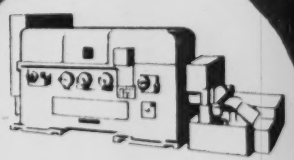
53-43

XLO

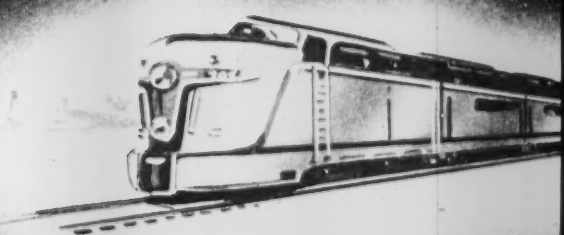


VERTICAL PRECISION BORING AND CONTOURING MACHINES





PRECISION TWO-WHEEL FORM GRINDER



EX-CELL-O

EASTERN REBUILT MACHINE TOOLS

EASTERN *has the largest stock of American made Machine Tools in the country.*

EASTERN *has the rebuilding facilities to make the machines equal to new in accuracy and general performance.*

This one photo DOESN'T TELL THE WHOLE STORY, but it does show one part of EASTERN'S warehouse and some of the machine tools that are ready for immediate shipment.

EASTERN has 135,000 square feet, all under one roof, that holds all the machine tools that are advertised, their sales office and their rebuilding shop.

SO, come to EASTERN where you can be sure to find not ONE, but DOZENS of the type of machine tools you need, and MOST IMPORTANT, where you may look over EASTERN'S rebuilding facilities, the finest in the country.

THE EASTERN MACHINERY COMPANY

1020 TENNESSEE AVENUE, CINCINNATI 29, OHIO
TELEPHONE: MELROSE 1241. CABLE: EMCO

Finest Steels

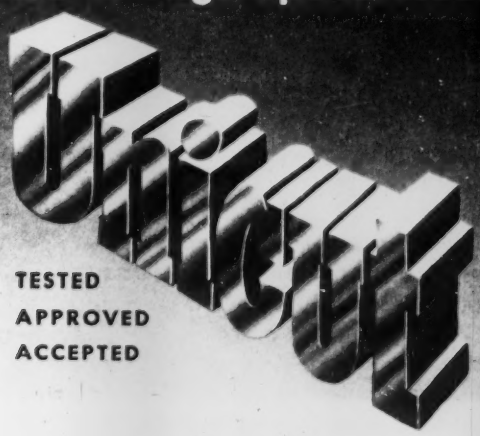
SINCE 1884 serving

THE TOOL MAKERS

THE MACHINE TOOL BUILDERS

with *High Speed Steels*

and especially the NEW STANDARD of High Speed Steels



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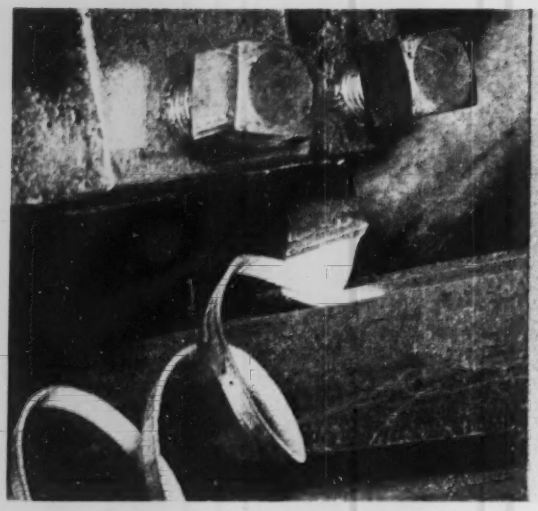


Machine Tools and

Replies to the survey indicate a continuing market on a high level for all types of machine tools. Lathes will lead—60 per cent of all plants now doing machining will buy them

FUTURE EXPANSION of machining capacity, indicated elsewhere in this survey, is verified by the charts here. Charts show the types of machine tools that metalworking plants now have and those they intend to buy.

Several trends are revealed in these figures. One shows that three out of five of all machining plants intend to buy more lathes. Heaviest expansion will fall in the engine-toolroom classification. Turret lathes, both ram and saddle types, also are in for expanded use with a total of 29 per cent of the respondents indicating they intend to buy one or the other of these types.

Nearly half of all plants doing machining intend to increase the number of grinding machines used. Many of these will be tool and cutter grinders, but all categories are included in the upswing.

More than half of the respondents indicate an intention to purchase boring and drilling machines. Significant factor here is the almost even split among all types of machines.

Comparison of these figures with the answers to STEEL's 1945 machine tool survey, show that in almost every case more plants have indicated they now own these machines than in 1945. Also, figures for the "intend to buy" column are as high as, or higher than, they were in 1945.

Thus, according to the metalworking executives who replied to this survey, the high rate of machine tool purchases will continue through the next few years.

In addition to contemplated expansion in many quarters, there will be a rising trend toward buying new machines to replace old and obsolete machines.

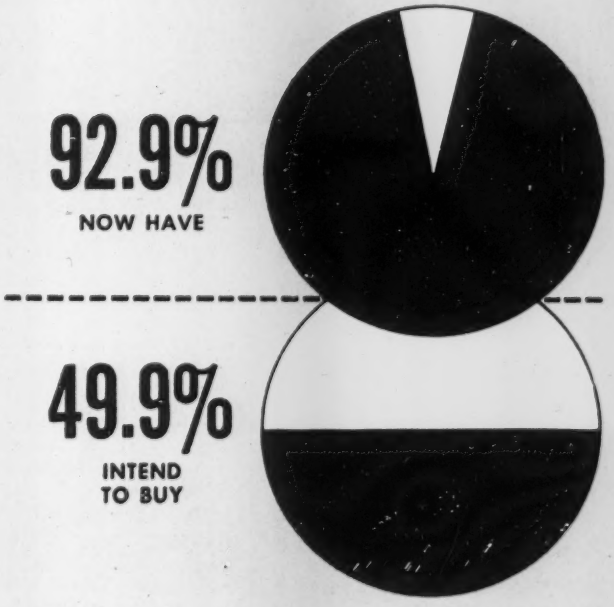
Answers to other questions in this survey show a real awareness, on the part of machine tool users, to the problems of obsolescence. In many cases, plants have been too busy for management to worry about replacing any machine which performed its required work at anything approaching an efficient rate.

As industry enters the highly competitive era ahead, these machines will have to go. Only those machine tools will remain which can pull their full share on the production oar.

in Use
Expected Purchases

1 Grinding Machines

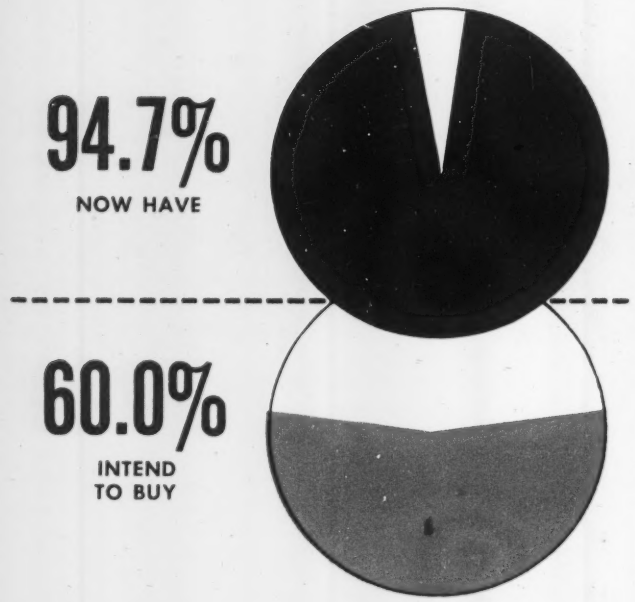
	% NOW HAVE	% INTEND TO BUY
Abrasive Belt	61.1	15.8
Bench	62.5	10.0
Centerless	26.1	14.5
Cam and Crankshaft	4.4	2.5
Disc	37.1	9.4
External Cylindrical	49.7	16.7
Honing and Lapping	26.0	9.2
Internal	37.7	11.8
Polishing and Buffing	35.8	8.3
Roll	6.4	2.4
Surface		
Reciprocating Table	48.4	16.3
Rotary Table	24.4	8.8
Thread	13.9	6.2
Tool and Cutter	62.7	18.1
Contour Grinding	9.5	6.2



2

Lathes

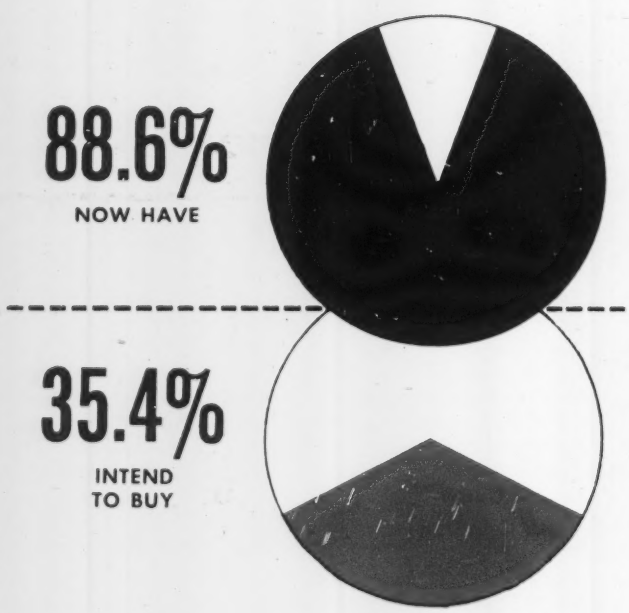
	% NOW HAVE	% INTEND TO BUY
Automatic		
Turret Type	36.2	15.8
Between-Centers-Type	16.1	6.6
Automatic Screw Machines		
Multiple Spindle	20.9	14.4
Single Spindle	25.8	14.0
Engine	80.8	25.8
Right Angle Facing	4.5	2.6
Roll Turning	5.3	1.9
Toolroom	68.7	20.8
Turret		
Ram Type	44.1	14.9
Saddle Type	38.3	13.9
Contouring	12.0	10.6



3

Milling Machines

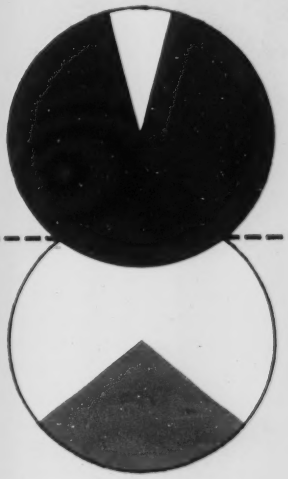
	% NOW HAVE	% INTEND TO BUY
Bed Type		
Horizontal	57.9	15.2
Vertical	30.4	10.1
Knee Type		
Horizontal	50.1	16.1
Vertical	33.2	13.8
Multiple spindle	8.4	4.7
Planer Type		
Double Housing	10.8	5.6
Openside	5.8	3.8
Routers	6.7	3.2
Tracer Controlled	6.9	6.2



4

Metal Cutoff Machines

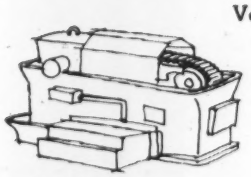
	% NOW HAVE	% INTEND TO BUY
Abrasive Cutoff	40.7	12.2
Band Sawing	72.0	13.4
Circular Cutoff Sawing	30.1	9.2
Hack Sawing	77.1	12.8

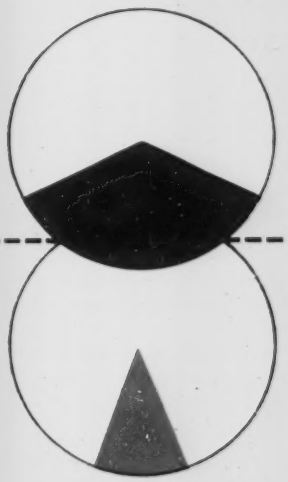


5

Broaching Machines

	% NOW HAVE	% INTEND TO BUY
Horizontal	25.9	8.0
Vertical	16.2	6.2

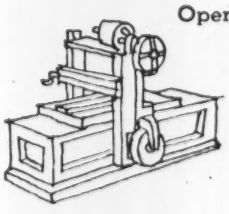


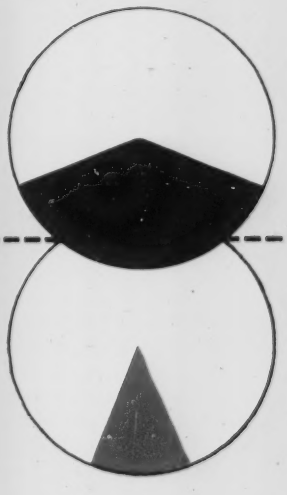


6

Planers

	% NOW HAVE	% INTEND TO BUY
Double Housing	28.1	6.2
Openside	19.7	7.0

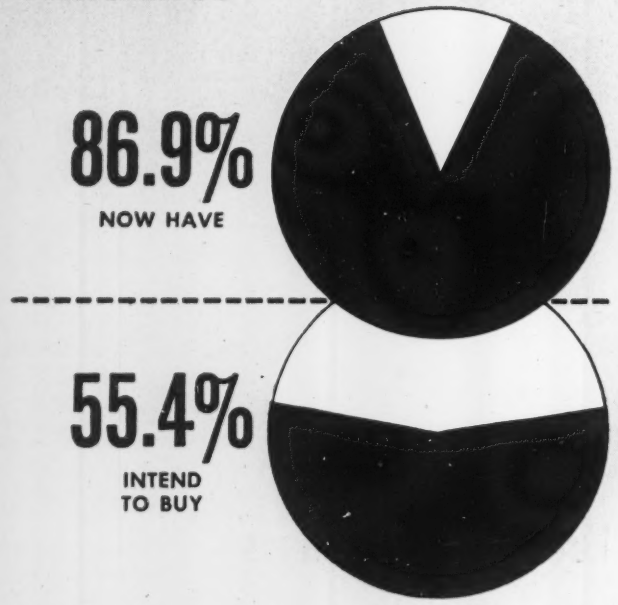




7

Boring and Drilling Machines

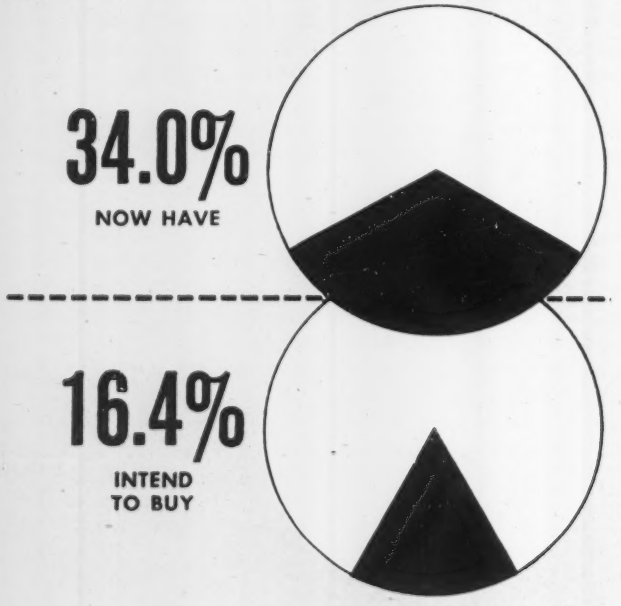
	% NOW HAVE	% INTEND TO BUY
Horizontal		
Floor Type	46.2	17.4
Table Type	34.0	13.3
Vertical	58.9	19.1
Jig	25.1	14.0
Multiple Spindle	42.0	19.5
Radial	49.9	19.7
Vertical Turret Lathes	27.7	14.5



8

Gear Cutting Machines

	% NOW HAVE	% INTEND TO BUY
Hobbers	22.5	10.6
Shapers	19.7	7.3
Cutters	15.2	5.2
Grinders	8.3	5.0
Shavers	6.6	4.8



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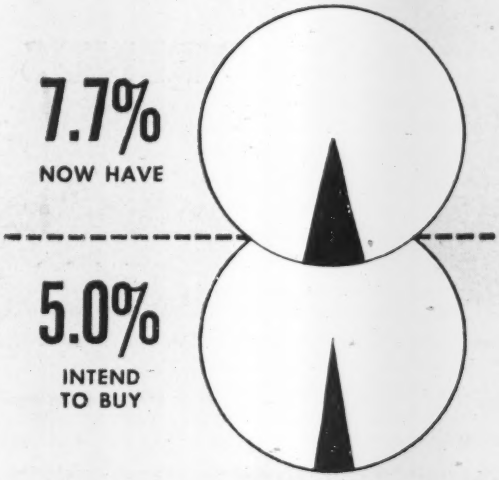
Die Sinking Machines



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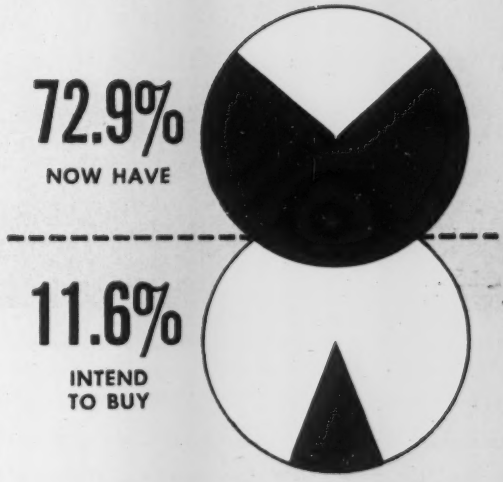
Shapers



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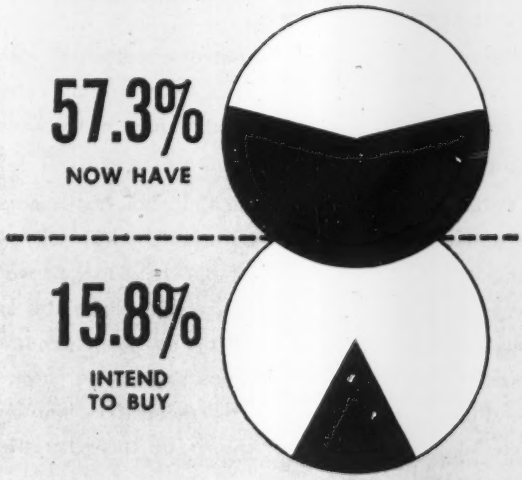
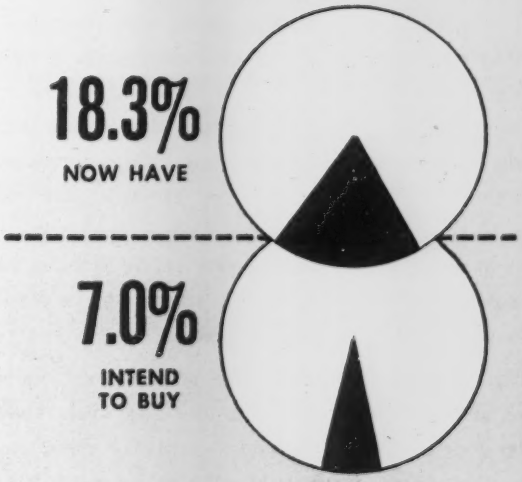
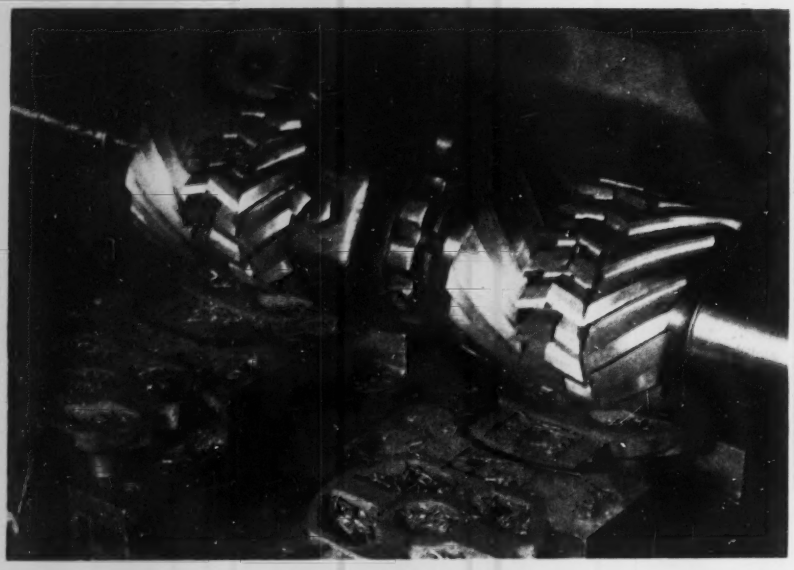
Tapping and Threading Machines



12

Thread Milling Machines





TRENDS IN

Machine tools are no longer designed just to remove metal. They must now remove the metal in the least possible time, over the longest possible machine life with the greatest possible accuracy. They must remove this metal with the least possible operator effort and at the lowest possible unit cost.

Machine tool users are interested in all of these factors when they buy a machine. They sometimes will have to make concessions in one area to gain in another, but all areas will be explored.

Design for Maintenance—Service and repair of a machine tool become big factors in its successful application. Downtime is often catastrophic. Keeping it to a minimum is almost a mania with some production men. The machine tool builder plays a part in the downtime picture. First, his machine must be rugged enough to withstand use without breaking down. Even more, his machine must be designed so that those parts subject to failure are accessible and easy to repair. No matter how complicated an operation is, the mechanism for performing it must be as simple as possible, so that repairs can be made without the aid of special service men.

Throughout this section, the machine tool users have shown their interest in idle and cycle time. Three-fourths of them would like higher speed motors. Two-thirds want chip handling devices. More than three-fourths want some system of centralized lubrication.

Nearly all are interested in rugged machines. Almost 70 per cent asked for more rigid bases and columns. More than 95 per cent want either hardened and ground, or hardened-insert type machine ways.

Most machine tool users prefer the electric control circuits to electronic. While the electronic circuits may be a simplification of the electric, many maintenance men are not adequately trained in electronics to make the necessary adjustments or repairs. Users comment that too often a specialist must be called in and while the machine waits, the cost of downtime mounts.

Future use of electronic control circuits will grow, but the rate of growth will depend to some extent on the availability of maintenance men in the users' plants who can service them.

Future development in machine tool features will grow out of the close co-operation between the machine tool builders and the suppliers of components, electric, hydraulic, pneumatic, etc. Perhaps the key role, however, will be played by the large group of machine tool users who express their preferences in meetings with the builders' representatives, and who also let their wants be known in their specifications and their orders.

Machine Tool Features

1

Bases and Columns

Demand for increased production leads to demand for a machine tool which is rugged enough to take sustained heavy cuts at high speeds and feeds. Rigidity of bases and columns is more important to the machine tool user than ever before. More than half the plants surveyed would like machines still more rugged than they now are. There is a preference for cast-type bases and columns. A large number, however, indicate no preference.

69.9%
WANT MORE RIGID BASES AND COLUMNS

18.3%
Prefer Welded Bases

40.1%
Prefer Cast Bases

41.6%
No Preference

2

Machine Ways

More than half of those who answered STEEL's questionnaire prefer hardened and ground ways. Over a third want the hardened-steel insert type. Conclusion is that the machine tool user is thinking about the ability of his machines to withstand heavy use. For a machine tool, the term withstand must include the idea of continuing to produce parts within the specified tolerances, dimensional, surface and rate of production.

REGARDED AS SATISFACTORY:

Hardened and Ground	57.1%
Hardened Steel Insert	38.6%
Regular Type	20.7%
Antifriction	8.6%
Plastic Insert	7.9%
No Preference	30.2%

3

Mountings

Largest number of persons feel that the standard machine tool mounting is satisfactory. One-third actually have no preference. Ability of machine tools to withstand vibration from outside sources without transferring its effect to the work is responsible for the lack of concern on the mounting problem. Some machines must have a special mounting of some sort, but in the majority of cases, the user feels that the manufacturer has provided the right answer.

PREFERENCES:

Standard Base	48.2%
Synthetic Rubber Base	11.8%
Felt Base	7.1%
Cork Base	2.7%
Spring Base	2.5%
No Preference	32.7%

4

Machine Controls

Electric controls for machine tools hold a 45 per cent margin over electronic controls. General opinion is that the electric circuits are easier to maintain, and more trouble free. While the electronic circuit is generally simpler, many plants do not have adequately trained personnel for maintaining them. Failure of an electronic circuit in these plants means sending out for a service man with resultant excessive downtime on the machine.

PREFERENCES:

64.1%	19.2%
PREFER ELECTRICAL CONTROLS	PREFER ELECTRONIC CONTROLS

21.0% Have No Preference

5

Machine Drives

Machine-drive system will vary according to the machine and its operation. Probably no one person would specify the same drive for all machines. General opinion, however, shows wide acceptance for the V-belt—it's also the most commonly used. One-third of the persons reporting indicate an interest in the variable-speed drive.

REGARDED AS SATISFACTORY:

V-Belt	53.5%
Variable Speed	36.3%
Hydraulic	36.2%
Gear	32.4%
Chain	9.5%
No Preference	14.0%

6

Machine Feeds

Constant demand for increasing feed rates has put the pressure on machine tool builders to come up with new ideas and with re-engineered systems. Reduction of pulsation and backlash, plus requirements for increased power keep engineers at the drawing board devising the right system for each application. Nearly even split here between hydraulic and mechanical feeds, shows user satisfaction with the engineers work to date.

PREFERENCES:

45.3%	41.9%
PREFER HYDRAULIC FEEDS	PREFER MECHANICAL FEEDS

20.8% Have No Preference

7

Tracer Controls

Big strides have been made in the last few years on the development and application of control systems for automatic duplication. One of the most important gains has been in the accuracy of the tracer mechanisms. Another gain is in the versatility of controls, making possible easier and faster setup on a wider variety of shapes.

PREFERENCES:

Hydraulic	31.2%
Electrical	13.3%
Mechanical	8.7%
Pneumatic	6.7%
No Preference	49.3%

8

Electrical Standards

Electrical manufacturers continue to work closely with machine tool builders and users to develop electric equipment suitable for machine shop use. A big problem is the service and maintenance of the electrical circuits. JIC code attempts to make the equipment tamper proof. Machine Tool Builders' code assumes that the personnel operating and maintaining the machine know the rules.

81.8%	22.9%
ACCEPT NATIONAL MACHINE TOOL BUILDERS ASSN.	ACCEPT JOINT INDUSTRY CONFERENCE (JIC)

9

Electric Motors

Over three fourths of the metalworking executives answering the survey want higher speed ranges on their machine tools. This reflects, in part, expansion in the machining of nonferrous metals. More than that, however, it shows the continuing trend toward higher machining speeds on all metals.

WANT HIGHER SPEED	75.9%
WANT HIGHER TORQUE	18.6%
WANT MORE POWER	17.4%

10

Chucks

Everyone agrees that sensational machining speeds are more advantageous when they are augmented with efficient methods of loading, unloading and clamping. Operator fatigue also plays an important role in the drive for shorter and shorter cycle time. Forty-four per cent of the answers to the survey indicated a preference for air-operated chucks. Next high goes to mechanical.

PREFERENCES:

Air-operated	44.6%
Mechanical	42.4%
Magnetic	21.5%
Hydraulic	12.7%
No Preference	19.4%

11

Chip Handling

Stepped-up production schedules, higher speeds and heftier cuts all mean more pieces off the machine plus more chips to be disposed of. Two thirds of the executives surveyed want more chip handling devices incorporated in their machining lines. A third intend to use automatic systems which serve all machines in a line. In addition to the saving in nonproductive labor, these automatic systems permit removal of chips without interrupting the machine cycle.

66.9%

WANT MORE BUILT-IN CHIP HANDLING DEVICES

33.4%

WANT A SYSTEM SERVING ALL MACHINES

12

Lubrication Systems

Eight out of ten of the metalworking executives who answered the questionnaire want some type of automatic lubrication system on their machine tools. Centralized systems already are so well established that the principal questions are the extent to which it should be employed and which system should be used.

PREFERENCES:

Fully Automatic	57.9%
Centralized Hand-operated	25.1%
Hand Operated	10.6%
No Preference	14.3%

13

Controls and Levers

Recent emphasis has been placed on the location of hand levers, push buttons, etc., by the machine tool builders. Concrete evidence of this is shown by the fact that 83 per cent of the survey answers show satisfaction with the present location of these items. In STEEL's 1945 Machine Tool Survey, 80 per cent of the men surveyed wanted better location of the levers and controls than existed at that time.

83.4%

CONSIDER CONTROLS AND LEVERS CONVENIENTLY LOCATED

16.6% DO NOT

14

Machine Maintenance

As the demand for production increases, the cost of machine downtime soars. Anything which can be done to lower the downtime ratio for any machine is invaluable to the user. Preventive and corrective maintenance both must be easy to accomplish, and proper care will keep them at a minimum. Part of the problem is up to the machine builder—his machine must be easy to work on.

New Machines Designed for Easy Maintenance?

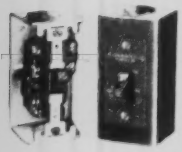
YES—67.1% **NO—32.9%**

Components that should be made more accessible:

Motors	39.0%
Hydraulic Systems	47.4%
Coolant Systems	30.8%
Electronic Controls	14.7%

ALLEN-BRADLEY QUALITY MOTOR CONTROLS FOR MACHINE TOOLS

FRACTIONAL HP STARTER
With Overload Breaker



Bulletin 600—Overload protection for your small motors.

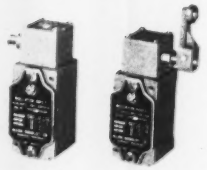
MANUAL STARTER
Across-the-Line Type

Bulletin 609—Most popular hand operated motor starter.

MANUAL STARTER
Watertight Enclosure

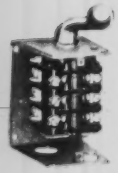
Bulletin 609—For installations exposed to moisture conditions.

OILTIGHT
LIMIT SWITCHES



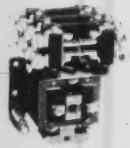
Bulletin 802T—Limit switches with various operating levers.

DRUM SWITCHES



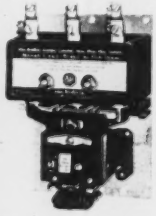
Bulletin 353—Drum switches Master—Transfer—Instrument.

SOLENOID RELAY
A-C Universal



Bulletin 700 BX—Changeable from N.O. to N.C. contacts.

SOLENOID CONTACTOR
50 Ampere Rating

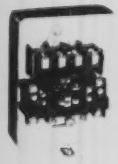


Bulletin 702—Contactors available up to 900 amperes.

PLUGGING SWITCHES
for Quick Stops

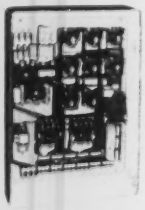
Bulletin 808—Zero speed switch for quick motor stoppage.

SOLENOID STARTERS
Sizes 00 to 7, Inclusive



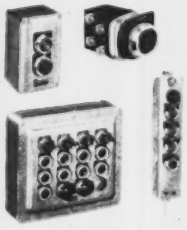
Bulletin 709—Most popular across the line motor starter.

CONTROL PANELS
for Sequence Control



Typical Allen Bradley panel for machine tool control.

PUSH BUTTONS



Bulletin 800 800T—Over 800 styles and types of controls.

A-C SOLENOIDS

Bulletin 860—A.C. Solenoids 9 sizes—25 & 60 cycles.

A-B Quality

● Here are starters, contactors, relays, and pilot controls for all types of motorized machines and equipment. These controls . . . and many more are listed in the latest Allen-Bradley Handy Catalog.

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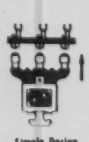
Allen-Bradley Co., 1320-G S. Second St., Milwaukee 4, Wis.

Simplicity—**The Key to the Leadership Position of Allen-Bradley Starters**

Solenoid Starter

Reliable Solenoid Motion



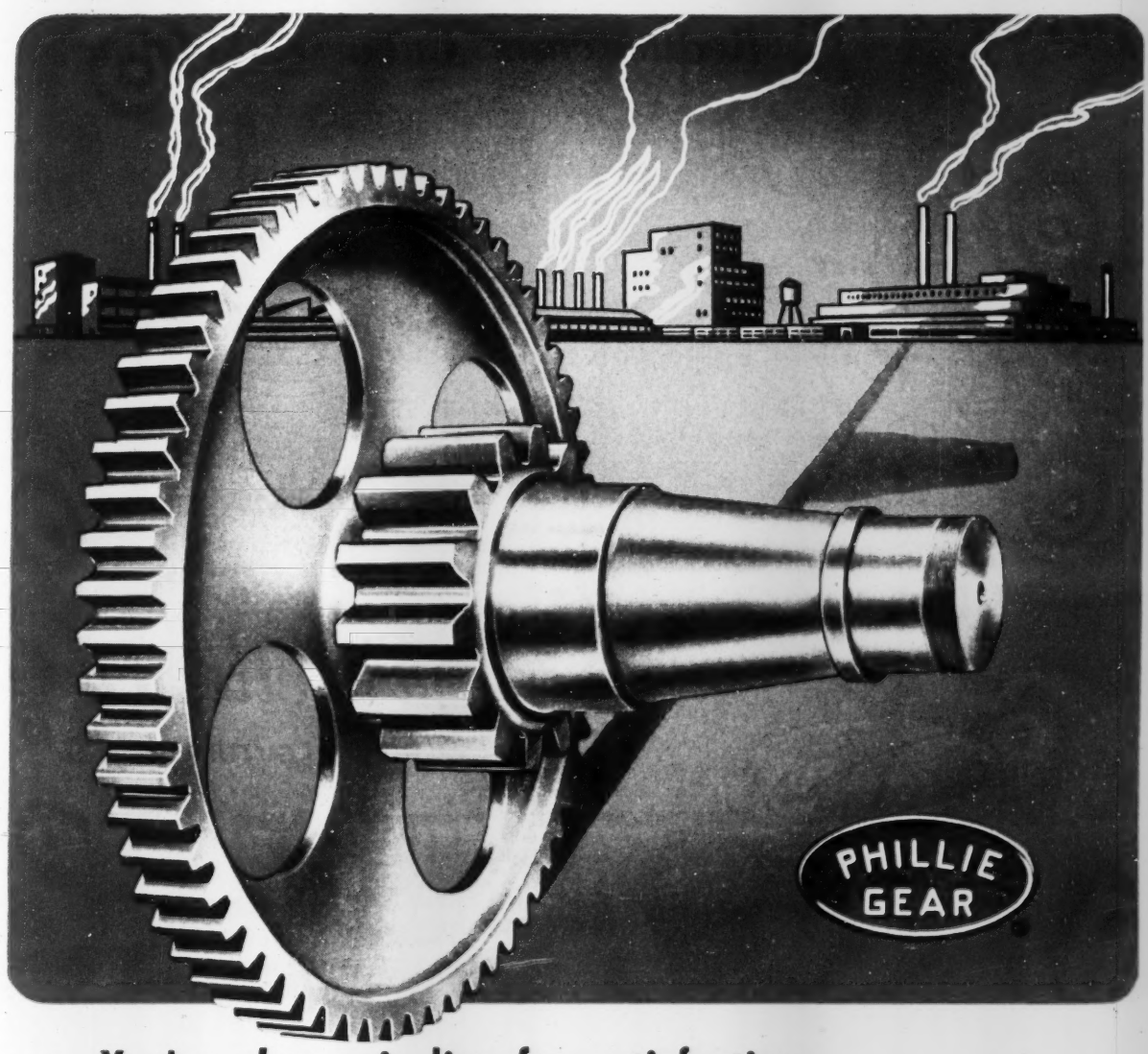
Simple Design Only One Moving Part

Enclosed Arc Hood a Compact Unit

Reliable Overload Relays

Maintenance Free Contacts

ALLEN-BRADLEY
SOLENOID MOTOR CONTROL
QUALITY



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Helical Internal
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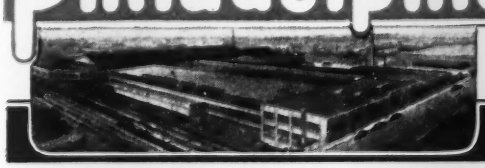
Intermittent
Sprockets

Philadelphia Gear Works, INC.



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LimiTorque Valve Controls

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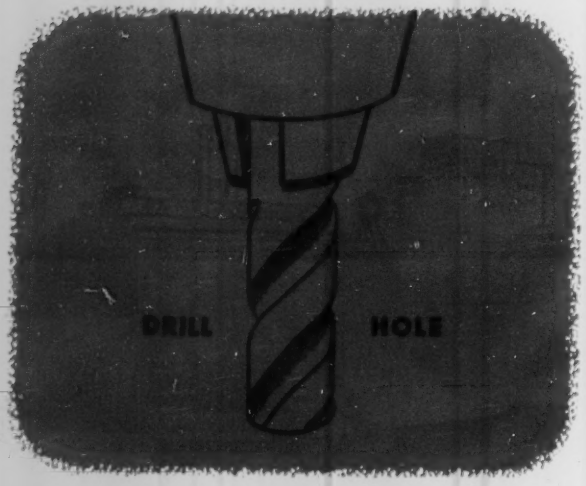

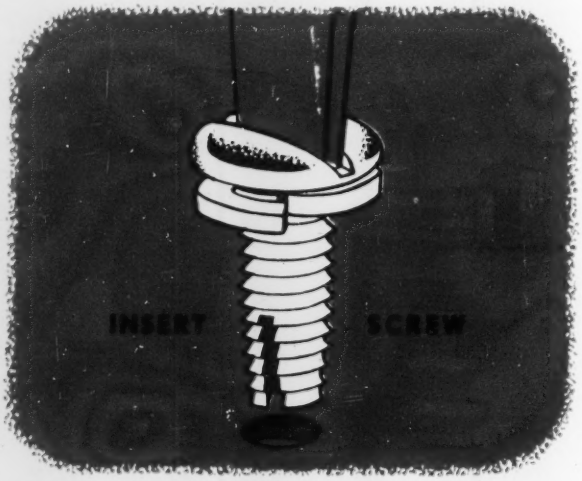

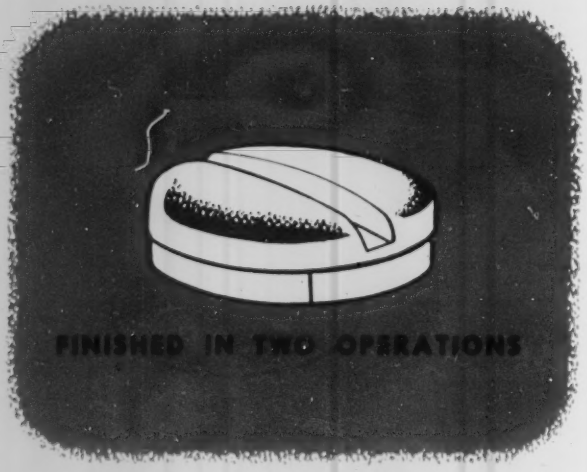

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"THREAD-CUTTING"

Springtites and Sems

Here are new production savings used by hundreds of manufacturers—Reliance "thread-cutting" Springtites and Sems! Review the simple 2 operations shown above, and you can immediately see the savings gained in your own production operation. Tighter and longer-lived assemblies also result in keeping bolted assemblies tighter longer! Reliance "thread-cutting" Springtites and Sems are available for all types of material (see right) and also as thread-cutting screws (without the preassembled spring lock washers). Test these Reliance cost cutting fastenings by writing for samples and a copy of Bulletin S-49A.

Type 1 for Steel . . . Ideal for sheet steels and stainless. Standard machine screw threads plus Reliance Spring Lock Washer for stronger, tighter assemblies.

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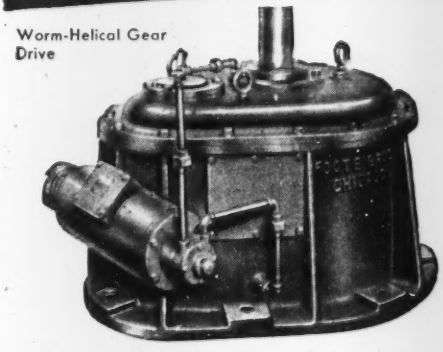

At Foote Bros. you'll find a complete line of enclosed gear drives. Modern, compact gearing — helical or worm — provides ratios up to 4,108 to 1 and capacities up to 1,550 h.p. to meet toughest speed reduction requirements. Also available for trouble-free service are Foote Bros.-Louis Allis Gearmotors, horizontal and vertical.

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LPB — Straight Line Line-O-Power Drives
LWA — Right Angle Line-O-Power Drives
GMA — Foote Bros.-Louis Allis Gearmotors
HGB — Hygrade Worm Gear Drives
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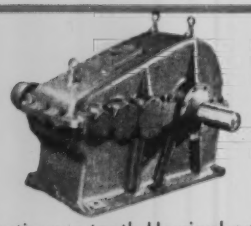
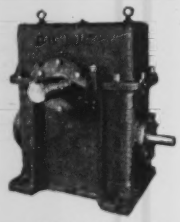
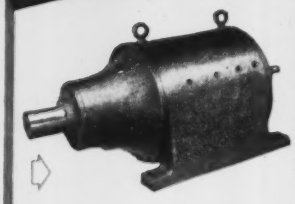
GEARED DRIVES MEET GROWING DEMANDS FOR POWER-SAVING EQUIPMENT IN INDUSTRY



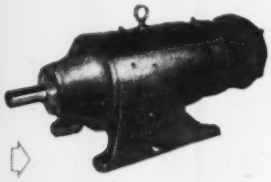
Continuous-tooth Herringbone
Single, Double, Triple Reduction



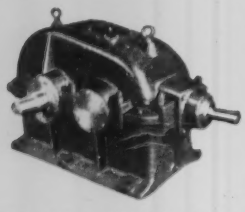
Type "H" Worm Gear



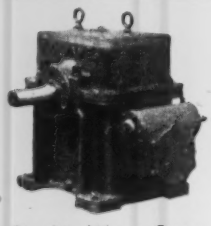
Straight Line Gear Reducer



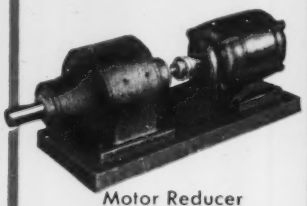
Motorized Reducers



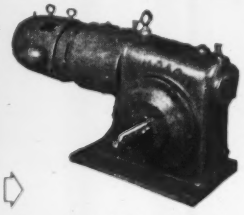
Spiral Bevel Herringbone



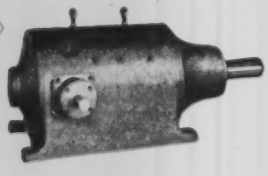
Double Worm Gear



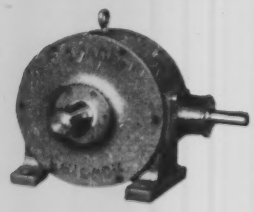
Motor Reducer
— a Packaged Unit



Motorized Worm Gear



Right Angle Gear Reducer



Spiral Bevel Gear

D.O.James Gear Manufacturing Co. is constantly developing and continuing to improve its variety of gear speed reducers—enabling engineers and designers of power-saving equipment to meet and cope with space limitations, horsepower requirements, ratios, location of driven or driving shafts and the type of drive that the many and varied installations require. Catalogs are available containing complete informative engineering data that will assist in the selection of the type of reducer for the specific job to be done.

D.O.JAMES GEAR MANUFACTURING CO.

Since 1888—Makers of Cut Gears, Gear Reducers and Flexible Couplings

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You can free machines and manpower for *saleable production*, and cut costs, too! Let Balcrank supply your needs for machine tool handles, wheels, levers and accessories. Balcrank skills have been built through 46 years of experience. There are more than 500 different standard models in stock ready to adapt to your requirements. Or we'll produce your own designs in reasonable quantity. Write today for our catalog and prices, or for any special data.

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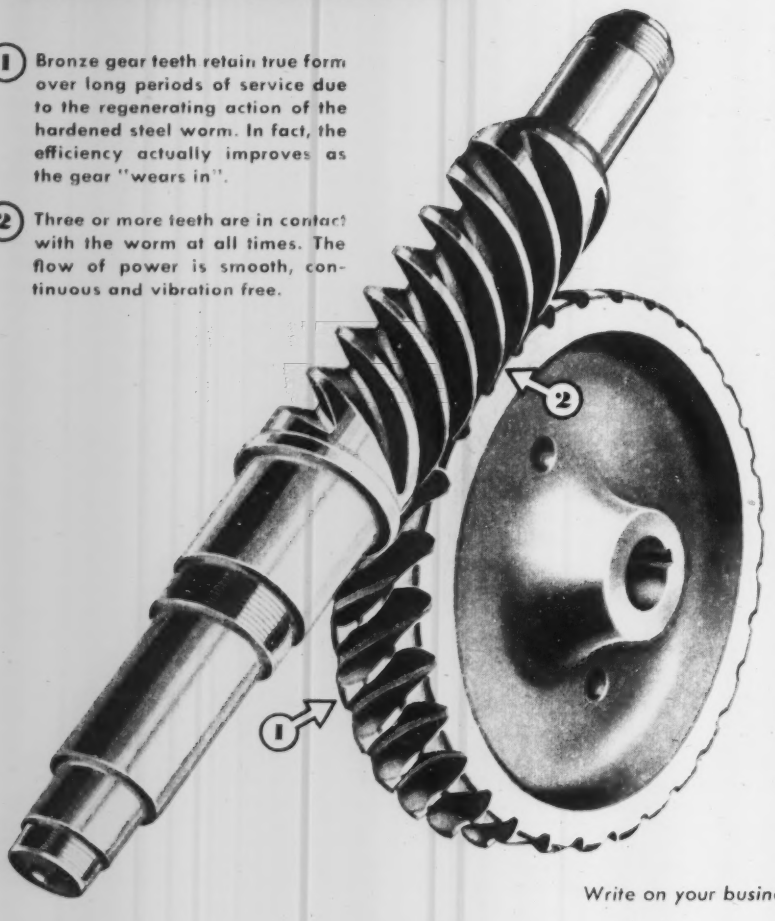
DE LAVAL
WORM GEAR SETS

can take "hard knocks"

(1) Bronze gear teeth retain true form over long periods of service due to the regenerating action of the hardened steel worm. In fact, the efficiency actually improves as the gear "wears in".

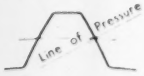
(2) Three or more teeth are in contact with the worm at all times. The flow of power is smooth, continuous and vibration free.



High Shock Load Capacity

Standard 14½° involute spur gear tooth and old time worm tooth.

20° stub spur gear tooth.



De Laval Worm Gear tooth. Note line of pressure falls inside base of tooth.

Write on your business letterhead for Catalog 5000

De Laval worm gear sets are designed to take punishment year-in, year-out. Gear teeth are under a crushing, instead of a bending load. Thus they withstand extremely high momentary and shock loads damaging to other forms of gearing. They need little attention even under the most rugged operating conditions.

De Laval manufactures these heavy-duty sets in a wide range of ratios from 3:1 to 100:1, with ratings of .1 hp to 550 hp and center distances from 3" to 36". It pays to design around these De Laval stock sizes. Special sets, however, can be furnished to any detailed specifications.

Proven applications of De Laval worm gear sets include the machine tool industry, rolling mills, process machinery, cranes and hoisting equipment and many similar uses.

DE LAVAL *Worm Gear Sets*

DE LAVAL STEAM TURBINE COMPANY
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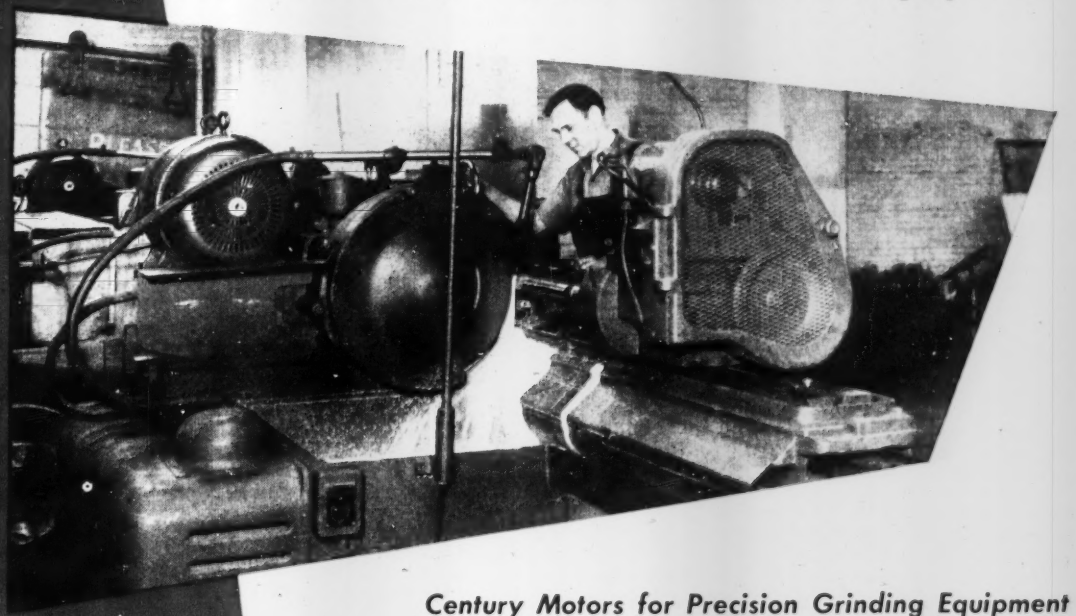
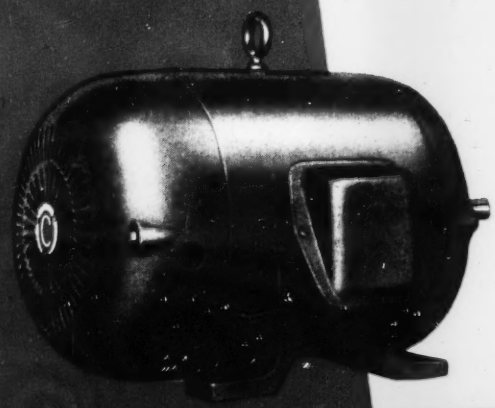
choose Century PRECISION MADE MOTORS

to Drive Their Precision Production Equipment



Century Totally Enclosed Fan Cooled Motor Driving a Grinder.



Century Motors for Precision Grinding Equipment

- Century Motors are unusually free from vibration — the business end of the grinder is not handicapped.
- Century Totally Enclosed Fan Cooled Motor, protects vital parts of the motor from gritty oil fumes in the surounding atmosphere.
- Motor feet are accurately machined for solid mounting.
- Ball bearing enclosures seal the lubricant "in" and the dirt "out." Lubricated at the factory for several years' normal operation. Provided with plugs for relubrication when required.
- Century motors are styled and finished in standard machine tool color to match the fine equipment they drive.

Specify Century Motors on your new motorized equipment and for replacement. Available in wide range of types, 1/8 to 400 horsepower.

CENTURY ELECTRIC COMPANY
1806 PINE STREET ST. LOUIS 3, MISSOURI

Century C MOTORS

OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

Trends in Production Methods

IN METALWORKING PLANTS DOING MACHINING

ACCORDING to the executives of those plants now doing machining, production machining is due for a boost in the coming years.

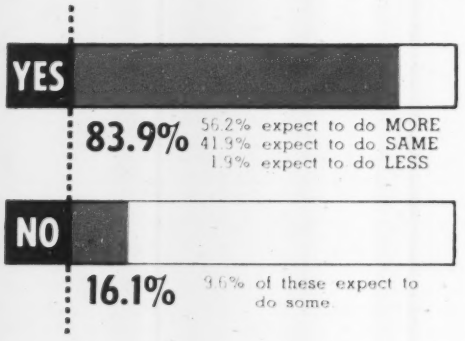
More than half of those plants who use machine tools for the manufacture of their product expect to do more production machining in the next few years. This means facilities will be expanded and additional equipment will be purchased.

Even the least-used processes in shops doing machining have a firmly-established role in future production plans. Cold extrusion, powder-metal forming, shell molding, die casting and metal-disintegrating machining all are indicated for future expansion.

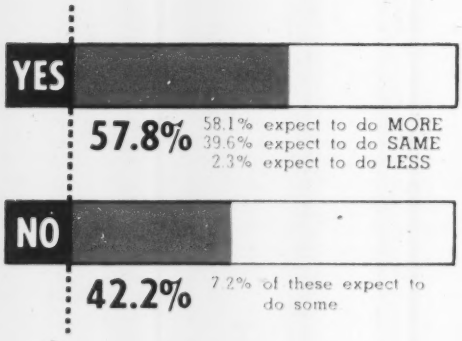
While 16 per cent of the respondents now do only maintenance machining, 10 per cent of these expect to use machine tools on production jobs. Again, new machines will be purchased and production facilities will be increased.

Production welding also will increase. More than half of the plants now welding on a production basis will add to their welding facilities. Over 19 per cent of those plants who now do no production welding will add it to their list of operations.

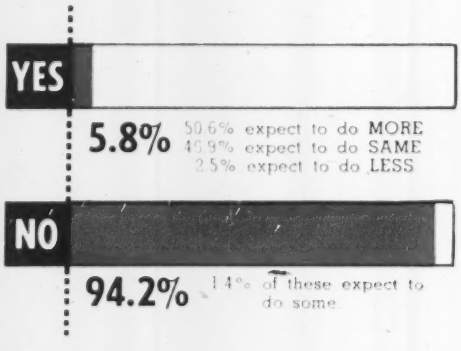
1 Production Machining?



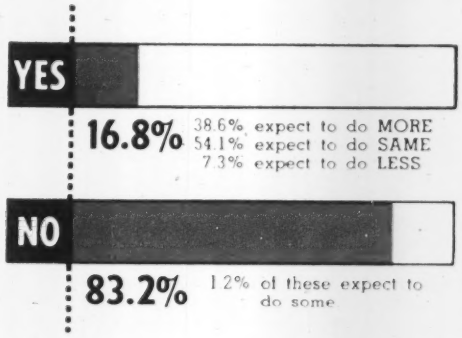
2 Stamping?



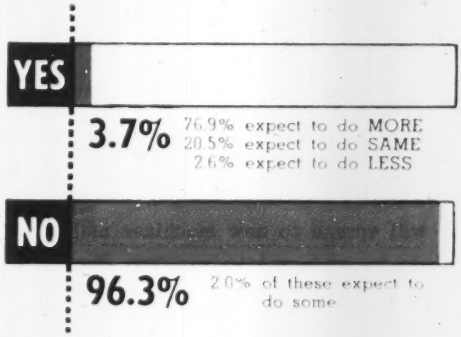
3 Cold Extruding?



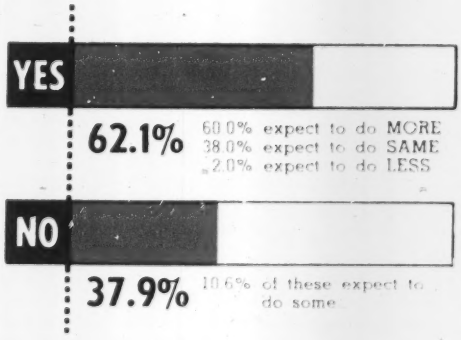
4 Forging?



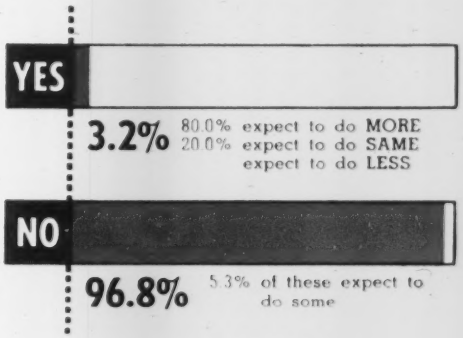
5 Powder Metal Forming?



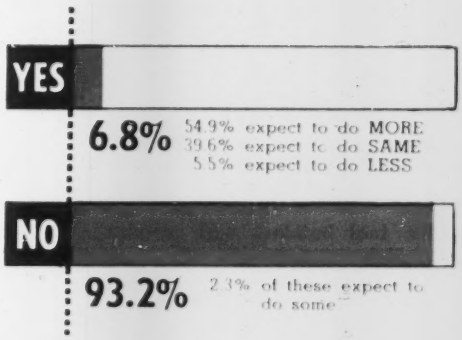
6 Production Welding?



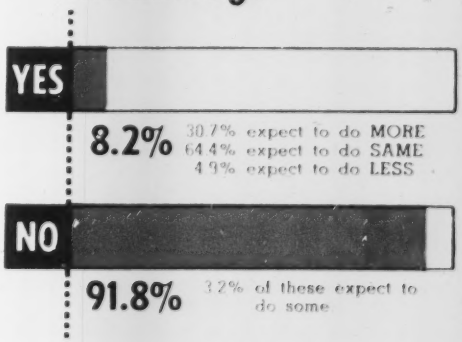
7 Shell Molding?



8 Die Casting?



9 Metal Disintegrating Machining?



Trends in Machining Methods

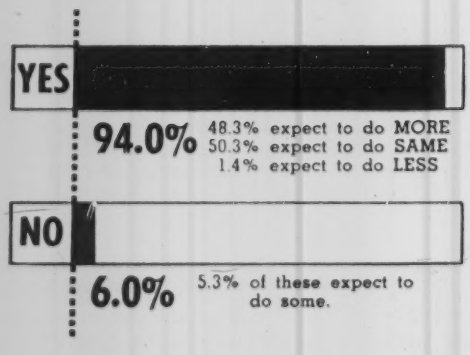
THE 2104 metalworking executives who answered STEEL's questionnaire feel there's little cause for machine-tool pessimism in the near future. In almost every case, the application of machine tools to a wide variety of jobs will increase in the next few years. Only a small percentage expect any cutback.

As should be expected, this study shows turning, milling, tapping and threading, boring and drilling, grinding, and sawing and cutting to be the most often used machining operations. None of these shows a tendency to drop off in the near future.

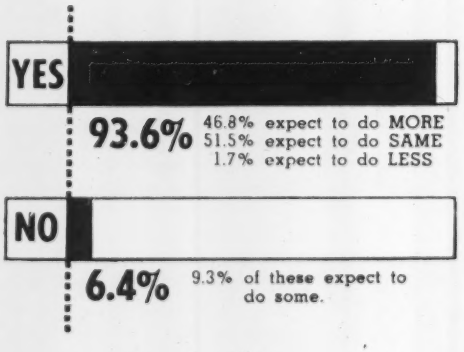
Machine tool builders will encourage the expansion of machining in many areas by redesigning their machines for higher speed machining, increased versatility, easier loading and unloading and less need for operator effort. New machines will offer increased production at lower unit cost, the tonic many plants will need for the competitive days ahead.

Machines which will perform these operations will continue to be, for the most part, standard machine tools. They will become more automatic with the addition of new and improved automatic-cycle controls. Use of automatic loading and unloading systems will spread to new machines and new jobs.

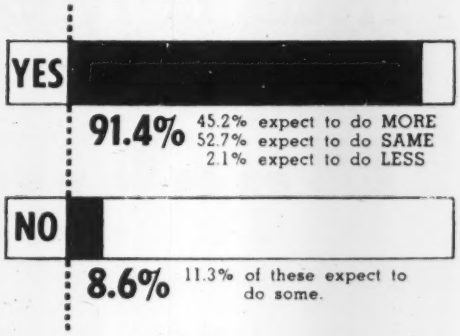
1 Turning?



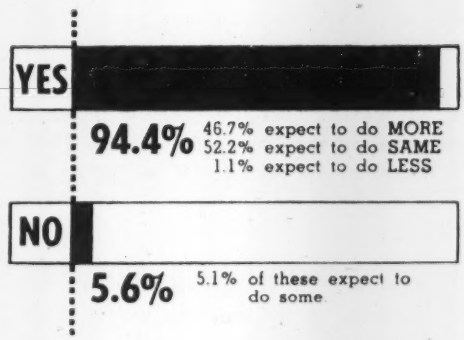
2 Milling?



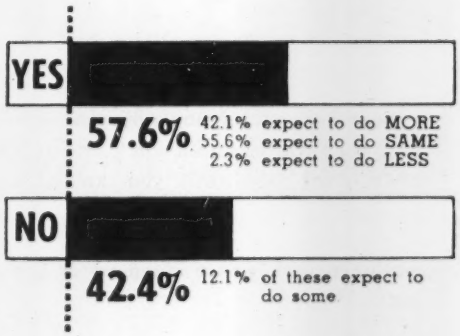
3 Grinding?



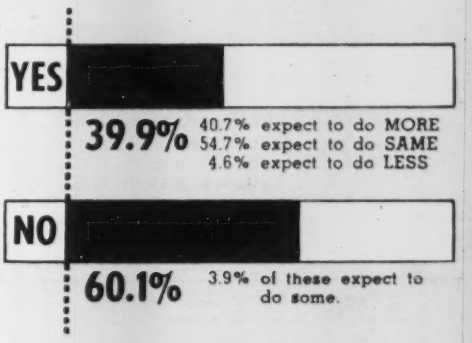
4 Boring and Drilling?



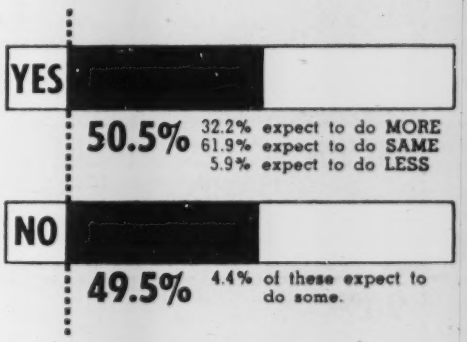
5 Broaching?



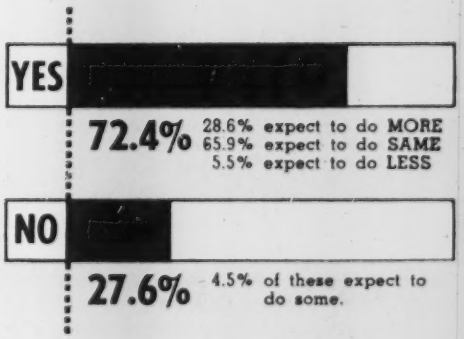
6 Gear-Cutting?



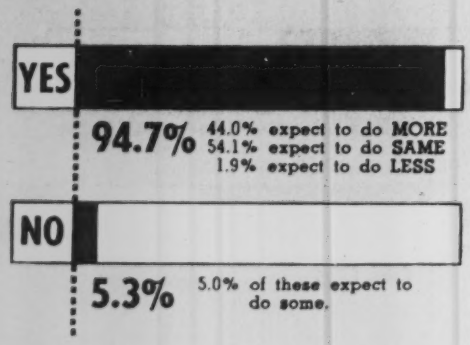
7 Planing?



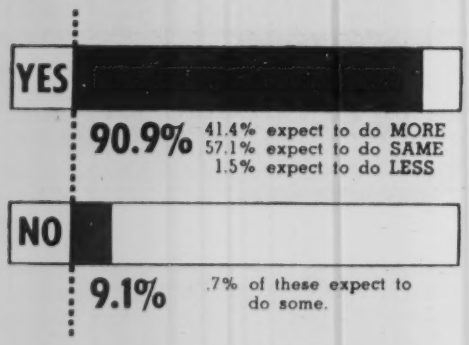
8 Shaping?



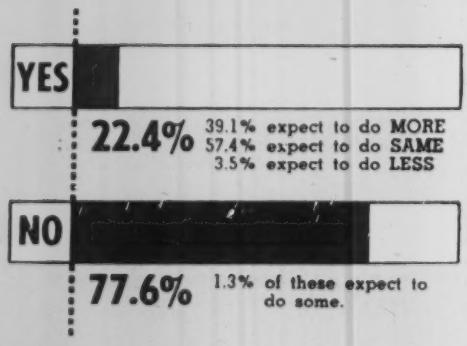
9 Tapping and Threading?



10 Sawing and Cutting?



11 Die Sinking?



Trends in Types of Machine Tools

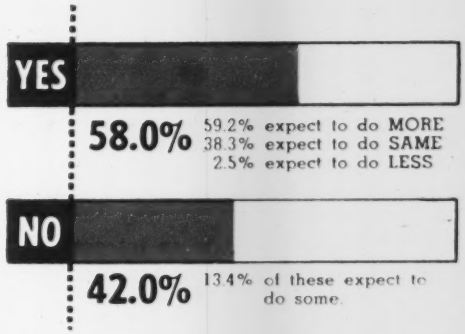
SPECIALLY BUILT and automation-type machine tools will find new areas of application during the next few years in plants using only standard machines. They'll also find expanded usage in the plants now employing them.

Big targets for these machines are nonproductive machining time—while the cutter is idle—and handling time between machining operations. Three-quarters of those plants now using automation equipment expect to incorporate it into their production systems.

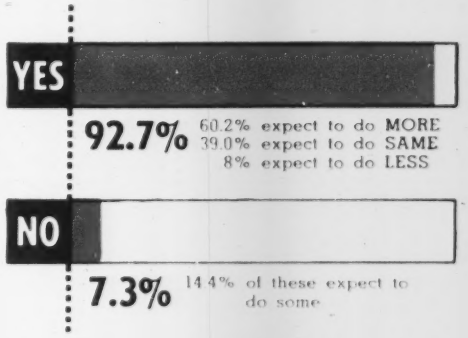
In spite of this strong trend, it's significant to note the great bulk of those plants which now use standard machines expect to make as much or more use of them. It shows that many jobs can't be done economically on single-purpose machines. The standard machine will continue to be the versatile strong arm of most production lines.

Your decision on single-purpose machines for your shop will be an economic one. If the nature of the work justifies it, you can't afford to use anything else. If the work doesn't justify it, your answer lies in the wide range of standard machines with either standard or special tooling.

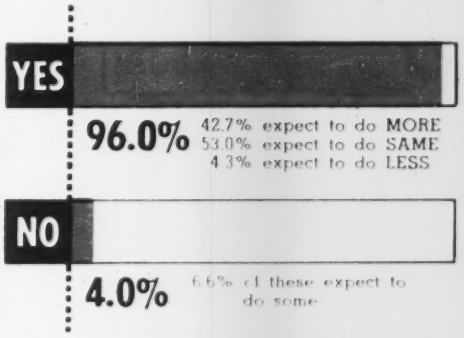
1 Machines Specially Built for Your Work?



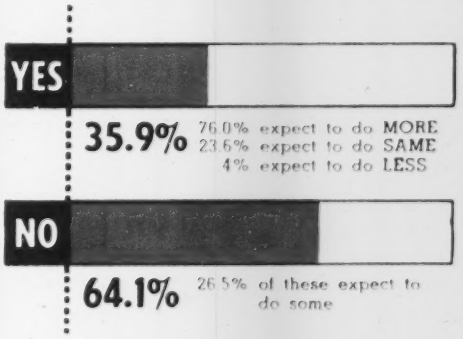
2 Standard Machines With Special Tooling, Jigs and Fixtures?



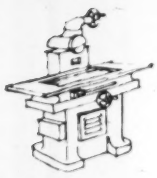
3 Standard Machines With Standard Tooling?



4 Automatic Work Handling Devices for Machine Tools?

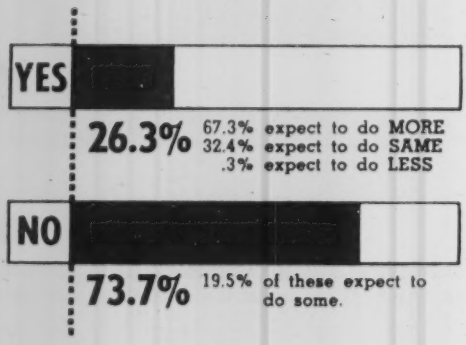


Trends in Tooling

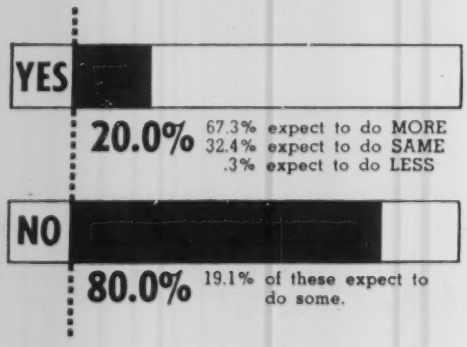


FAST metal removal is an integral part of future plans for expanded metal-working capacity. What once was spectacular removal rate for almost every machining method now has become strictly commonplace. One contributing factor is the spectacular performance of carbides. They'll be used even more in the future. Automatic gaging will play its part in the acceleration because of its ability to cut the time corner while alleviating the problem of human error.

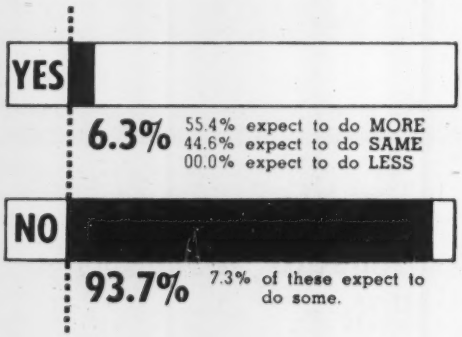
1 Super-Speed Turning?



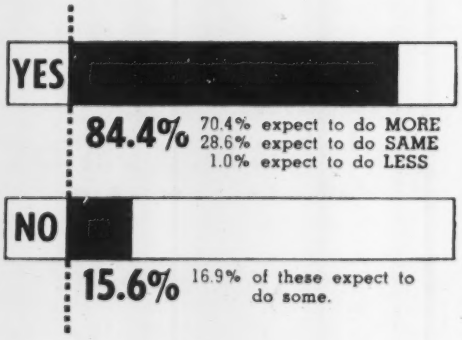
2 Super-Speed Milling?



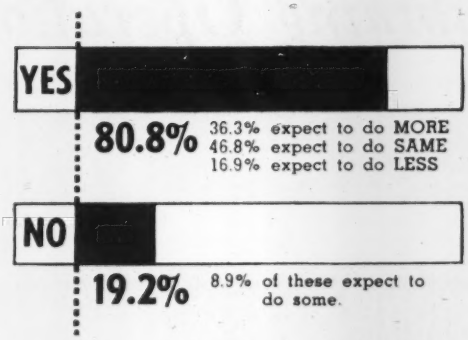
3 Super-Speed Broaching?



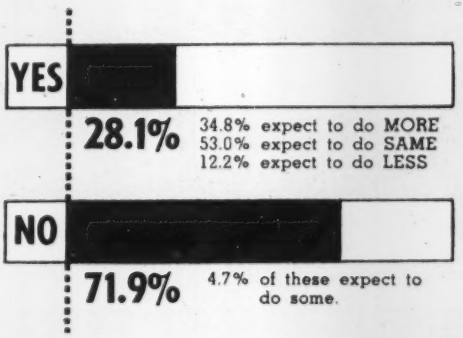
4 Carbide Tooling?



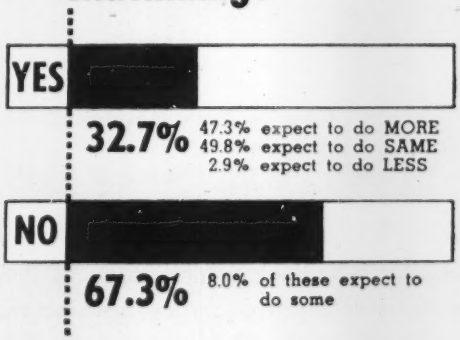
5 High-Speed Tooling?



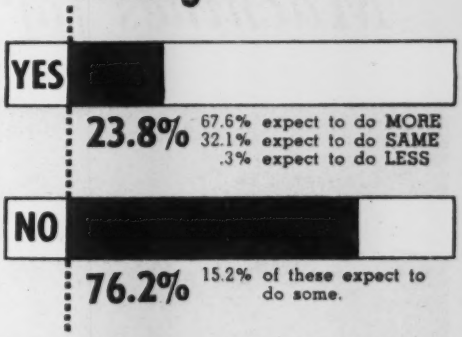
6 Cast Stellite Tooling?



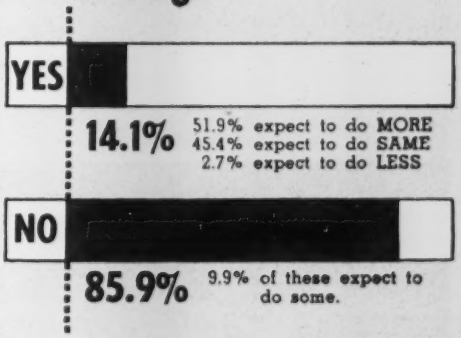
7 Negative Rake Machining?



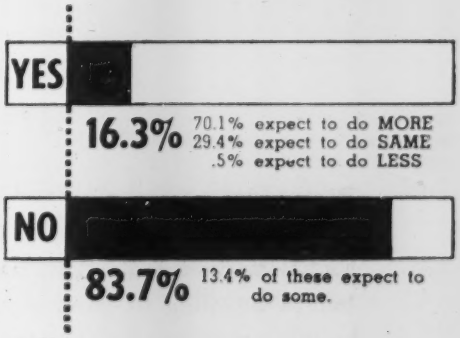
8 Contour-Controlled Turning?



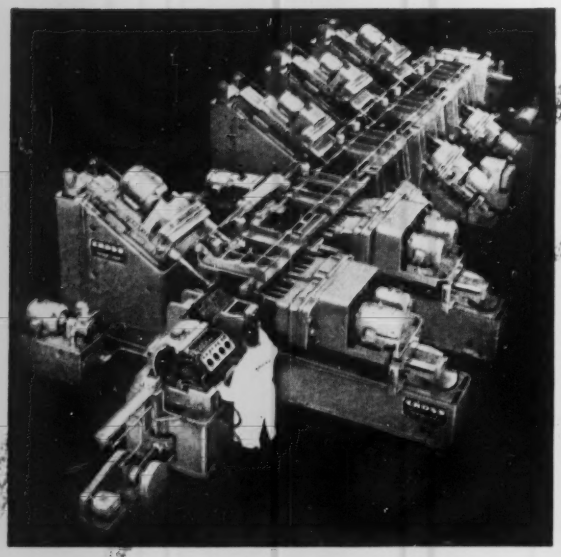
9 Contour-Controlled Milling?



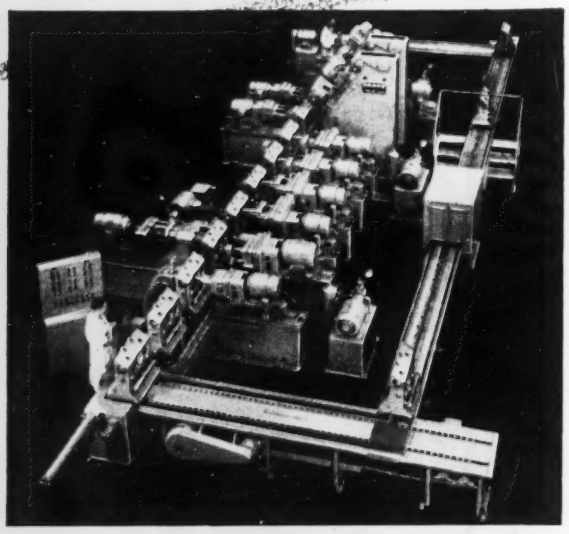
10 Automatic Gaging?



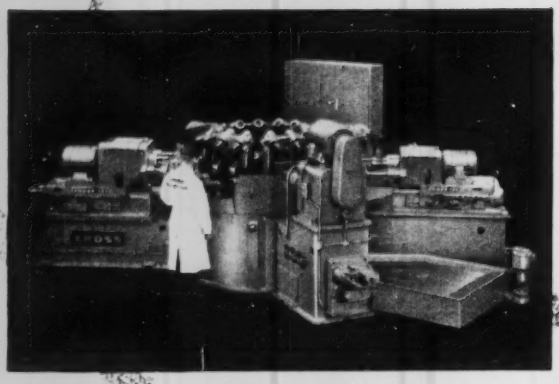
Four Types of Multiple Station Machines for Combining Operations



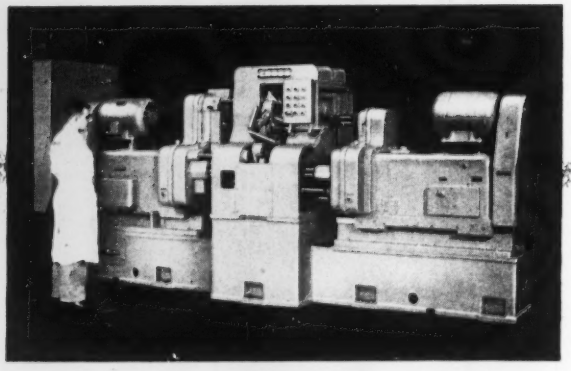
Transfer-matic



Pallet Type Transfer-matic



Dial Type Machine



Trunnion Type Machine

Recognizing today's vital need for more production and lower costs, The Cross Company has pioneered many advancements in special machine tools. They have led the field in improving automaticity . . . decreasing human handling of parts . . . performing more operations on one machine tool . . . building machines to operate with a minimum of unskilled labor.

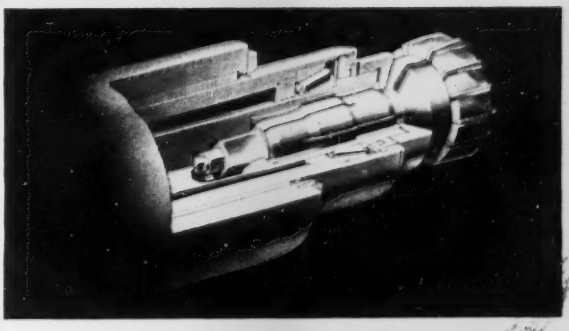
CROSS

Machine Control Unit

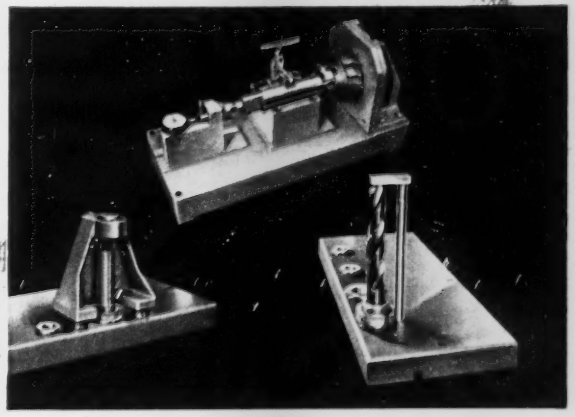
Cross Machine Control Unit with Toolometer

Basic components of the Cross Machine Control Unit include a master control board, a work bench, a master tool setting fixture, setting gages for all tools, two complete sets of pre-set tools and holders, and Cross Toolometers to automatically shut down the machine when any tool needs changing.

The Cross Machine Control Unit reduces tool breakage . . . eliminates machine adjustments for tool changes . . . permits the use of less skilled operators . . . reduces scrap caused by tools which have become dull or have "lost size".



Machine Spindle with Cross-Drive



Standard Fixtures for Pre-Setting Tools

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

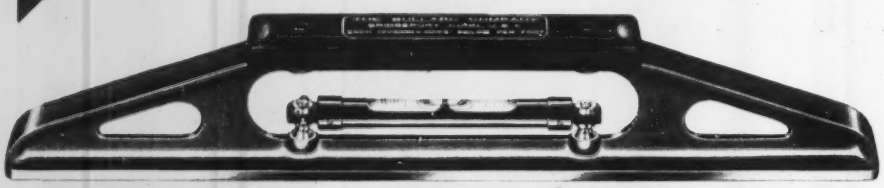
Special MACHINE TOOLS

PRECISION COUNTS

You Can Count on a BULLARD Precision Aligning Level

Today's high standards of machining accuracy make it imperative that the machine is maintained level at all times. Among the innumerable factors that work against this condition are constant vibration, settling of buildings and floors and the molecular changes of cast iron and steel. Increase the life of machines — lower maintenance cost — by using a Bullard Precision Aligning Level.

Available in 18" and 21" sizes



Check these Features

1. The vial used is made of the best optical glass, specially ground, and is filled and guaranteed by one of the greatest Level Makers in the world.

2. The vial is mounted on two brass studs, which permit of adjustments in the same manner as the Level Vials on the finest surveying instruments.

3. The Bubble in the Vial has a guaranteed sensitiveness of 5 seconds of arc per graduation. This is equivalent to showing per graduation on Vial a variation of .0003 of an inch per foot.

4. The Level Casting is thoroughly insulated from the palm of the hand by means of a handle of special non-conductive material.

5. The design is the result of long experience. The casting has been seasoned, machined and scraped with meticulous care.

6. The Levels are made in two sizes, 18-inch and 27-inch, which covers the requirements for leveling all types of machines.

7. This Precision instrument is safely protected in a felt lined box.

THE BULLARD COMPANY *Telephone 6-2511*

BRIDGEPORT 2, CONNECTICUT

Denison HydrOILic Equipment

PUMPS and CONTROLS

for circuits developing up to 5000 psi

The typical Denison HydrOILic Pumps and Controls shown here have proved their *extra* capacity for continuous, heavy-duty service. Many are built for 5000 psi duty, yet cost no more than other makes of lower rating.

Comparison will prove why more and more users, year after year, insist on Denison HydrOILic Pumps and Controls for circuit needs of every type. *Let us send you bulletins covering your needs.* Write.

HIGH PRESSURE PUMPS

Hydraulically balanced axial-piston design. 2500, 3000, 5000 psi capacities. Constant or variable volume. 3.5 to 55 gpm capacities. Volume control (for 10, 20 and 55 gpm models only) by handwheel, stem, cylinder, or pressure compensation. Face, flange or foot mountings. Catalogs P-1, P-2, P-5, P-10.

PUMPING UNITS

Self-contained pumping units with centre pump, motor and valve assembly unit-mounted on reservoir top. 57 models offer 2 to 55 gpm capacities. For 400 to 5000 psi operating pressures. Constant and variable volume types. Volume control by handwheel, stem, or pressure compensation. Automatic water-cooled oil coolers and 2-pass heat exchangers available for extra heavy duty. Bulletin PU-1.

SURGE DAMPING CONTROL

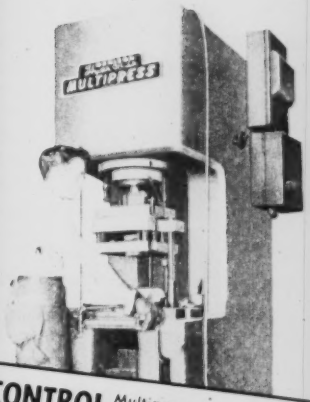
Eliminates destructive pressure shock in hydraulic systems to 5000 psi. Easily installed. Does not affect function of other components or cycle time. Adjusts automatically to any working pressure; acts with split-second speed. No adjustments necessary. Industrial and aircraft types available. Catalog VS-1-A.

"The Finest Money Can Buy!"

DENISON HydrOILics

MULTIPRESS

MULTIPRESS offers maximum advantages of hydraulic power – *rapid action, wide adjustability, and accurate control* – in nine frame sizes that meet an unusually wide range of production needs. Ram speed, maximum tonnage, and stroke length are quickly adjustable. Stroke length may be set for either distance or pressure limits. Choice of controls – hand-lever, push-button, foot-pedal, automatic cycling, and *dual* manual or electric safety controls. Denison's exclusive "Vibratory Ram Action" is available for problems of air escapement from dies, density control, or uniformity of compaction.



Standard Multipress accessories offer extra speed and efficiency on many operations. These include Index Tables, Dial Feed Tables, a Harmonic Stock Feed for continuous production from coil stock, preform equipment, straightening fixtures, foil marking equipment and others.

TOUCH CONTROL Multipress is available with "Touch Control." Ram starts, stops, speeds up, slows down, reverses and applies pressure in exact split second relation to the way the operator moves or presses down on the hand lever. Pressure can be applied to work in varying degrees of force, at the user's option.

SPECIFICATIONS		BENCH MODELS					FLOOR MODELS			
Frame Size		B	D	F	G	H	K	L	N	Q
Capacities (Tons)		1	2,3,4,6	2,4,8	5,10	5,10,15	25	35	50	75
Max. Ram Speeds (I.P.M.)	Closing	1100	1300	1300	700	700	530	530	290	210
	Pressing	400	570	570	220	280	250	250	145	110
	Opening	600	920	920	310	500	470	470	290	220
Max. Stroke		6"	12"	12"	12"	12"	15"	15"	15"	15"
Max. Daylight Open'g		15⅛"	12"	18"	24"	23"	24"	24"	24"	30"
Throat Depth		5"	6"	8⅛"	12"	10"	12"	12"	12"	10"

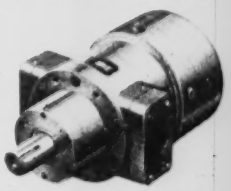
CHOICE OF MANUAL AND AUTOMATIC CONTROL VALVES FOR ALL MODELS

Dual-Purpose PUMP/MOTOR for 2000 psi

Denison's single-stage, vane-type Pump-Motors, for continuous use at pressures to 2000 psi, *are ready for either pump or fluid motor duty* without alterations. Rotation of shaft—either direction, without change or adjustment. Four sizes, plus interchangeable cam rings, offer pumping capacities from 4 to 82 gpm, or torque ratings from 15 to 25" inch-pounds per 100 psi. Catalog P-5.

DENISON DIRECTIONAL CONTROLS ¼" to 2"

Denison 4-way valves are ruggedly built for every need, in ¼" to 2" sizes, for all requirements to 5000 psi. Standard optional spools for many porting requirements. Manual, mechanical, electric and pilot control of valve operation, with combined pilot-operated solenoid controlled models for your toughest jobs. Three-land spools in sturdy subplate or threaded body types provide dependable service. Catalogs VD-3, VD-I-1, VD-1-2.



High-Torque FLUID MOTORS

Denison efficient high-pressure axial-piston fluid motors offer torque capacities from 15.8 to 112 inch-pounds per 100 psi—equivalent to 5 to 160 hp output at 5000 psi. Maximum operating speeds from 1500 to 5000 rpm. Face, flange and foot-bracket mountings. Catalogs FM-2, FM-3.

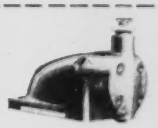
Multi-Range FLOW CONTROLS

Denison Multi-range Flow Controls permit *full-scale* regulation of flow in variable speed circuits. They are quickly and easily adjustable to various pump deliveries *without changing speeds*. Compact, cartridge-type, single-spool design is ideal for meter-in, bleed-off and other operations at all circuit pressures to 3000 psi. 12 models; 2-port and 3-port types, with or without built-in check. 0 to 28 gpm capacities. ¼" to ¾" size. Catalogs VFC-1 and VFC-2.

Hydraulically Balanced PRESSURE CONTROLS

Denison hydraulically balanced compound valves provide unusually close control over valve opening and closing pressures.

They assure improved performance for systems up to 5000 psi . . . equal efficiency for both low and high pressure circuits . . . trouble-free service . . . an adjustment range for your exact needs. Proved in thousands of installations from the simplest to the most complex automatic systems. Types and sizes for all needs—¾" to 2". Catalogs VR-2-B and VR-3-2.



PRESSURE REDUCING VALVES

For independent control of reduced secondary circuit pressures while the primary circuit operates at higher pressures. For requirements up to 5000 psi and from 20 gpm to 65 gpm. Threaded, flange and subplate mountings. Catalog VPR-1.

The DENISON Engineering Co., 1163 Dublin Rd., Columbus 16, Ohio

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 2)

ONE SOURCE FOR ALL TOOLING NEEDS

THE *RIGHT* STEEL OR CARBIDE . . . THE *EXACT* METALLURGICAL COMBINATION NEEDED TO DO YOUR JOB BEST . . . FROM A SINGLE MANUFACTURING SOURCE

The next time you have a difficult tooling problem we invite you to call in a Firth Sterling man.

He may be called a "tooling specialist" or a "sales engineer" . . . but anyhow he's just a fellow who understands the *cutting*, *shaping* and *forming* of metals like nobody's business. He *may* be a graduate engineer, or he may have learned the hard way on a milling machine, draw bench or press, but he *knows* the score.

He can give you an unbiased recommendation . . . because he has approximately 100 different grades of Firth Sterling high speed steels, and tool and die steels to choose from *and* a dozen grades of tungsten carbide in everything from die nibs to a virtually unlimited variety of standard and special carbide cutting tools and tips.

All this is backed by 64 years of leadership in the development and production of special purpose steels, and 24 years of pioneering in carbide and "powder metallurgy" applications.

It makes sense, that a company which engages in *all* phases of tooling metallurgy will serve your interests best.

Remember, Firth Sterling *is* a single, dependable source for complete shop tooling.

Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

(Advertisement)

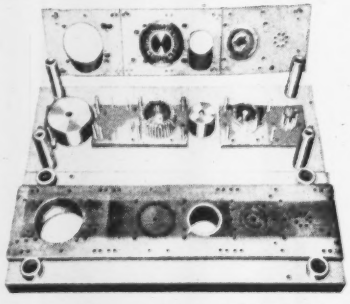
A VERSATILE FAMILY OF *Tool and Die Steels*

CROMOVAN • AIRVAN • INVARO

Certain steels or families of steel stand out as having almost universal application for general use, ranging from moderate to high production as job requirements demand. One such Firth Sterling family of steels consists of CROMOVAN, AIRVAN, and INVARO. CROMOVAN and AIRVAN are air hardening; INVARO is oil hardening.

ANALYSES

	CROMOVAN	AIRVAN	INVARO
Carbon	1.60%	1.00%	.90%
Chromium	12.50%	5.25%	.50%
Vanadium	1.00%	.25%	.20%
Molybdenum	1.00%	1.15%	—
Manganese	—	—	1.15%
Tungsten	—	—	.50%



Generally speaking, CROMOVAN is intended for long production runs where hundreds of thousands or millions of pieces must be produced at minimum cost; AIRVAN for intermediate runs where toughness and high abrasion resistance are also requirements; INVARO, an oil hardening tool steel for all other general use.

Full technical details are available in these free bulletins. Write for them today or ask your Firth Sterling representative to call and discuss your tool and die needs . . . steel *or* carbide.

Firth Sterling

INC.

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES* AND WAREHOUSES BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON*

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

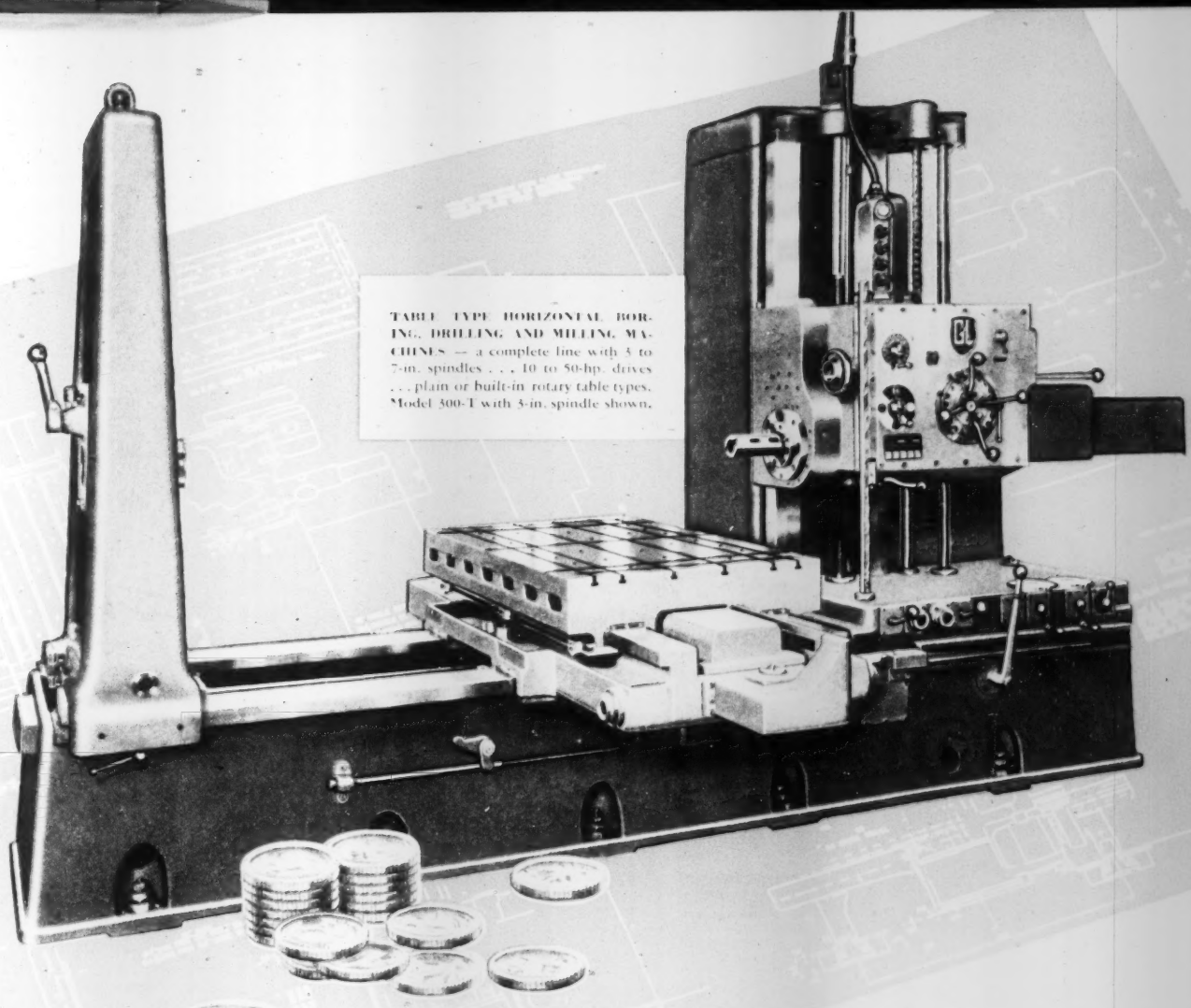


TABLE TYPE HORIZONTAL BORING, DRILLING AND MILLING MACHINES — a complete line with 3 to 7-in. spindles . . . 10 to 50-hp. drives . . . plain or built-in rotary table types. Model 300-T with 3-in. spindle shown.

Blueprint

for money-making metalworking

When buying a horizontal boring, drilling and milling machine, a vertical boring mill, a planer or a planer-miller you select a machine that will earn a reasonable return over a long period of time under normal working conditions.

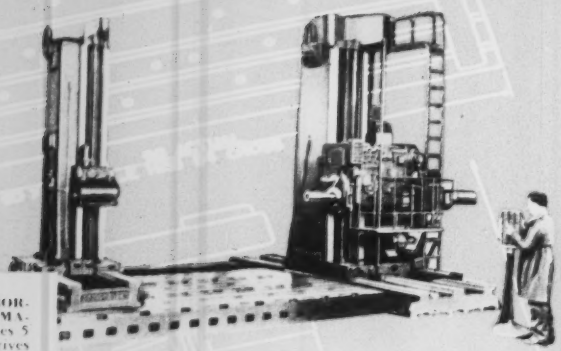
This is certainly an important factor in every machine tool purchase . . . but there is also another fact which should receive your careful consideration. To get the soundest return on your investment you should select a machine that can not only handle your scheduled work but also take care of the many odd job assignments as well. In other words, be sure to select a machine that will allow you to capitalize on future unforeseen work assignments.

That's why the world's most efficient and profitable shops buy Giddings & Lewis heavy built machine tools. Experience has proved to them that G&L assures a perfect combination of capacity, versatility, precision and speed with every machine purchased. They know G&L equipment gives them the best money-making investment, not only for this year, but for many years to come.

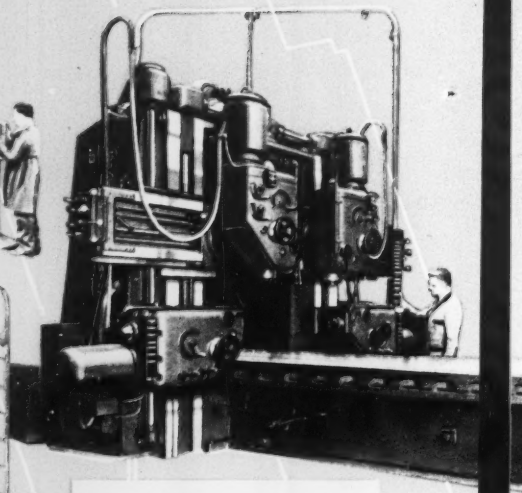
On this and the following pages are typical machines which have given G&L the reputation of being the "World's finest builder of heavy-duty machine tools."

GIDDINGS & LEWIS MACHINE TOOL CO.

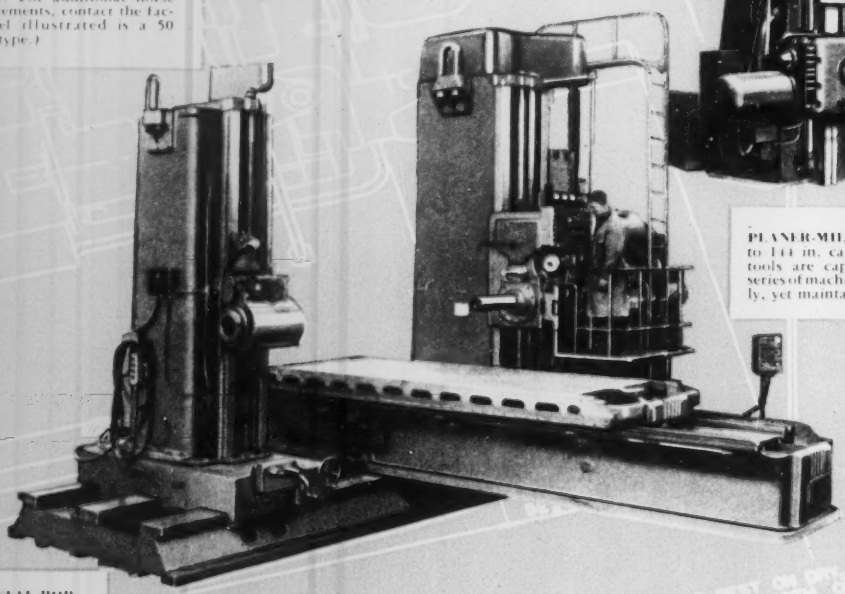
FOND DU LAC, WISCONSIN



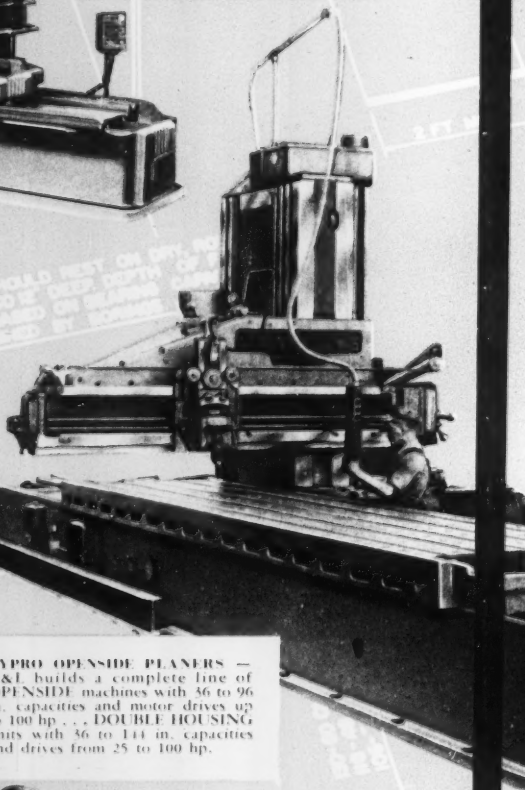
FLOOR TYPE HORIZONTAL BORING, DRILLING AND MILLING MACHINES — Models with spindles 5 to 8 in. diameter . . . motor drives 20 to 50 hp. For additional horse power requirements, contact the factory. (Model illustrated is a 50 Series floor type.)

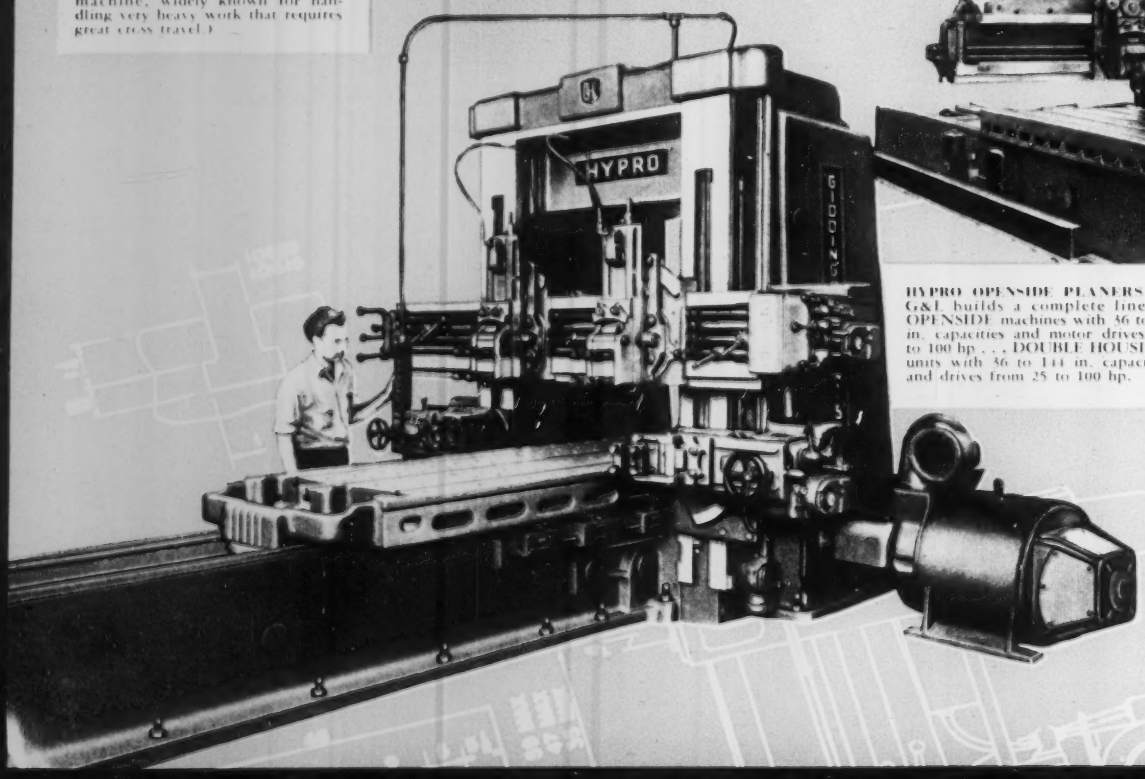


PLANER-MILLERS — Built with 80 to 144 in. capacities, these machine tools are capable of performing a series of machining cuts simultaneously, yet maintaining overall accuracy.

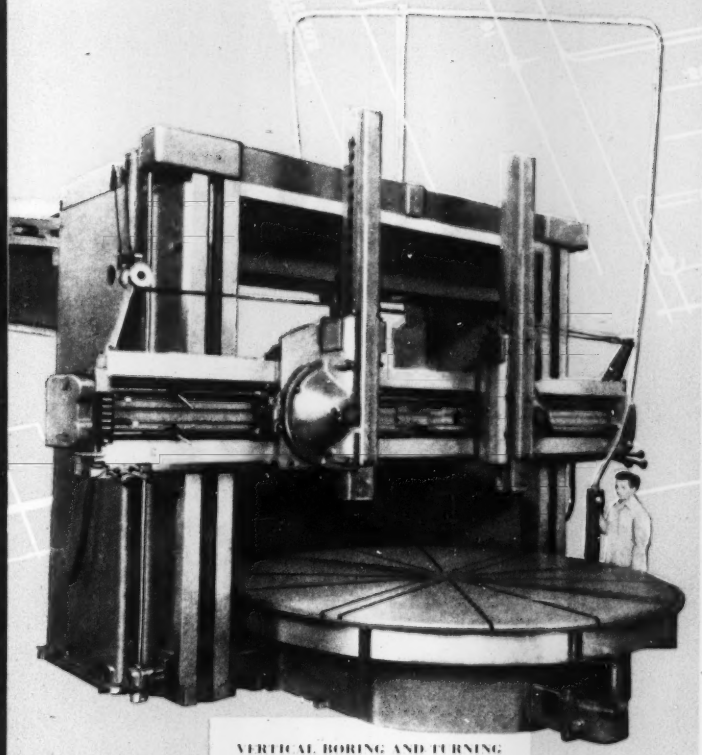


PLANER TYPE HORIZONTAL BORING, DRILLING AND MILLING MACHINES — Models with spindles 5 to 8 in. diameter . . . motor drives 20 to 50 hp. For additional horse power requirements, contact the factory. (Illustration shows a 50 Series machine, widely known for handling very heavy work that requires great cross travel.)

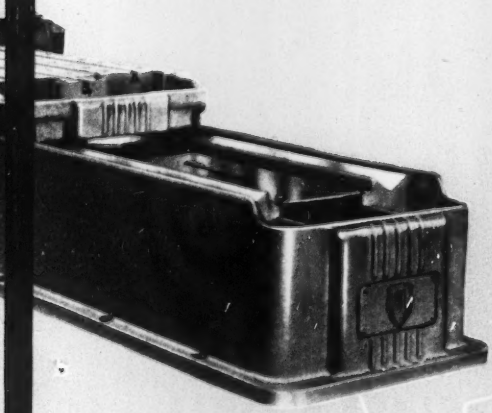




HYPRO OPENSIDE PLANERS — G&L builds a complete line of OPENSIDE machines with 36 to 96 in. capacities and motor drives up to 100 hp . . . DOUBLE HOUSING units with 36 to 144 in. capacities and drives from 25 to 100 hp.



VERTICAL BORING AND TURNING MILLS — Available with capacities of 42" to 12 ft. . . . motor drives up to 100 hp. (Machine shown is one of the larger units. It features the new pendant control and electro-hydraulic shift.)



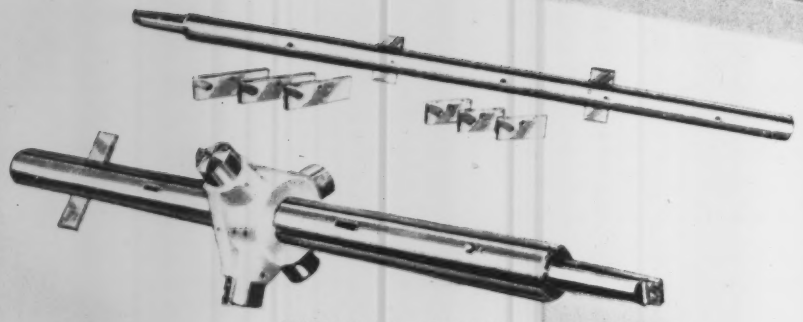
Capacity, versatility, speed and precision

. . . the hallmarks of every Giddings & Lewis Machine Tool

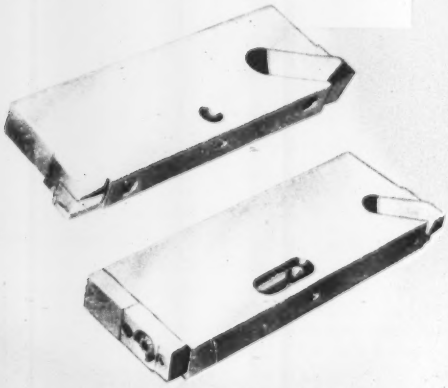
Because Giddings & Lewis manufactures a complete line of heavy machine tools, it is in a position to recommend, on an unbiased basis, any one of several economical ways for the handling of heavy metalworking requirements. Customers are invited to submit their heavy metalworking production problems for a Giddings & Lewis job analysis.

STUB BORING TOOLS — available in sets consisting of precision-made stub boring bars that are accurate to .0001 in. fine adjustment, range from $\frac{1}{2}$ to 7 in. dia.

BLOCK TYPE CUTTERS — available in single or double adjustable types for boring range $\frac{1}{4}$ to 17 in.



BORING BARS — in a wide range of plain and block type bars for specific applications.



DAVIS BORING TOOLS

...protect your machine tool investment

If you seek the unusual capacity that means money-making metalworking . . . contact your Davis representative or write

The Davis Boring Tool Division of Giddings & Lewis offers comprehensive tooling service. They build plain and micrometer adjustable block type boring tools; line boring bars; special boring tools; car wheel boring tools; planer, vertical boring and turning mill tools; Quick Change arbors and sleeves. If you have a tooling problem, it will pay you to consult the Davis Engineering Service. *If Davis can't bore it, it can't be done!*

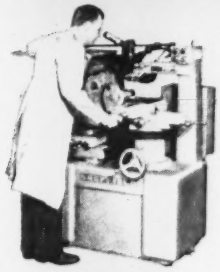
GIDDINGS & LEWIS MACHINE TOOL CO.

FOND DU LAC, WISCONSIN

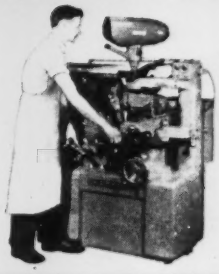
Builders of the world's finest heavy-duty Horizontal Boring, Drilling and Milling Machines — table, floor and planer type; Hypro Double Housing and Openside Planers; Planer Type Milling Machines and Vertical Boring Mills; and Davis Cutting Tools.

Printed in U. S. A.

guard *PRECISION* in the shop

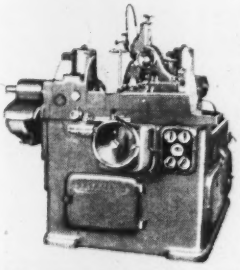


Micro-form Grinder, Model 121 grinds high precision profiles both flat and circular directly from large scale drawing, saving up to 75% over conventional practice.

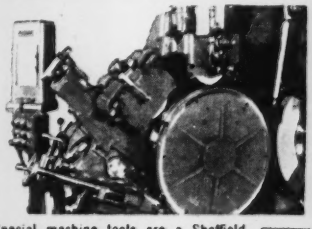


Micro-form Grinder, Model 122 equipped with a combination 30 power microscope and viewing screen.

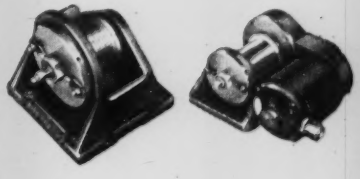
Thread and Form Grinder, Model 133 uses the multi-ribbed wheel principle to grind small precision threads and intricate forms on a high production basis.



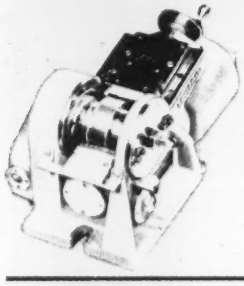
Precision Thread and Form Grinders —100 Series, produce precision threaded elements and cylindrical forms by the Crushtrue method, the diamond dressed multi-ribbed wheel or the single point wheel method.



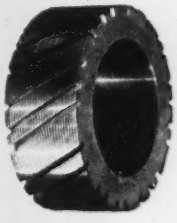
Special machine tools are a Sheffield specialty, such as this one of 12 jet turbine shroud grinders placed in operation within the last six months.



Idler and motorized type Crushtrue devices are available for forming grinding wheels on standard surface grinders.

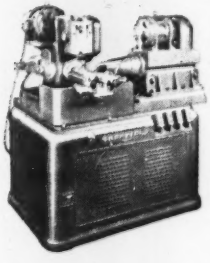


Self-truing Motorized Crushtrue Device forms surface grinder wheels for the grinding of flat form tools, etc. of the highest precision and uniformity.

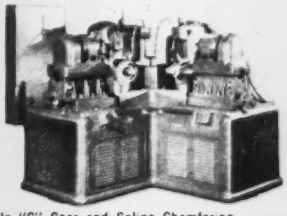


The Sheffield Crushtrue Roll Bank plan provides Rolls for production use while worn rolls are enroute to Sheffield for re-grinding and re-ground rolls are enroute from Sheffield for use. Nominal exchange charge.

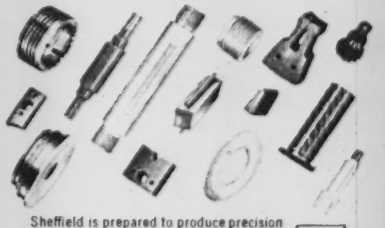
Gear and Spline De-burrizers deburr or chamfer up to 600 gear teeth per minute. Applicable to spur, helical, hypoid, bevel and herringbone gears —also multi-start worms.



Gear and Spline Chamfering Machines chamfer, burr or recess the ends of gear teeth at high production rates—ideal for short runs and quick changeover.



Style "C" Gear and Spline Chamfering machines have two cutter spindles and two workheads for mass production gear manufacture.



Sheffield is prepared to produce precision threaded elements and formed parts on contract to augment your own manufacturing facilities.

CHECK THE BOX ☑ **for any piece of equipment or service in which you are interested. Tear this out, attach it to your letterhead, mail to Sheffield, and detailed engineering data will be forwarded.**

Machine Tool Division • The Sheffield Corporation
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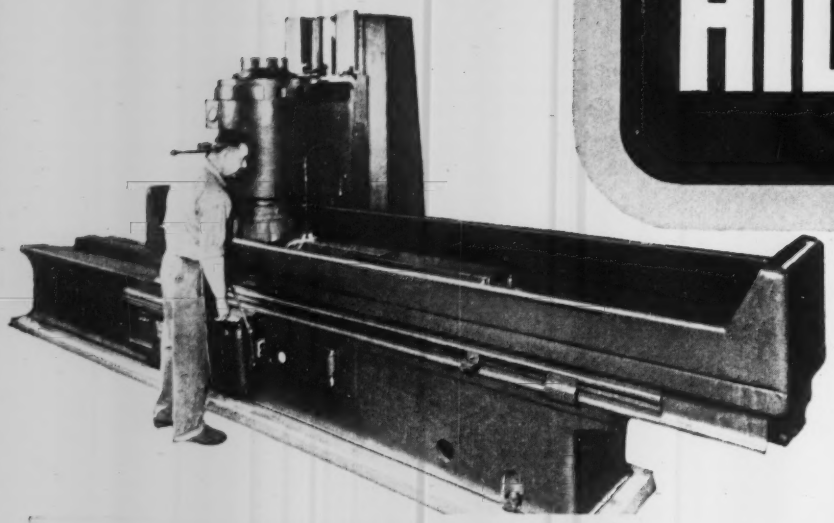
MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

SHEFFIELD

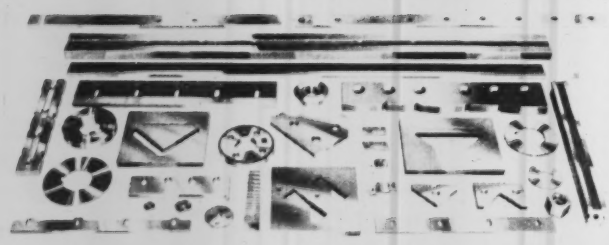
6559

HILL ACME



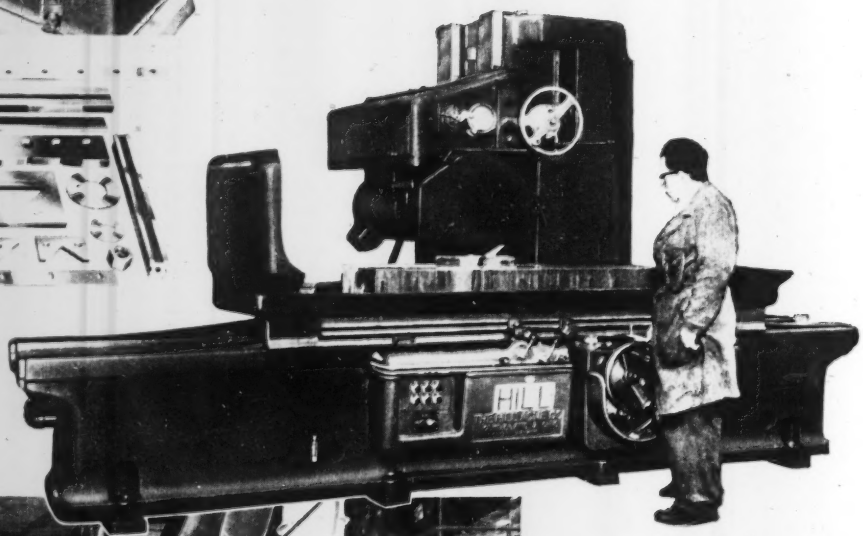
VERTICAL SURFACE GRINDER

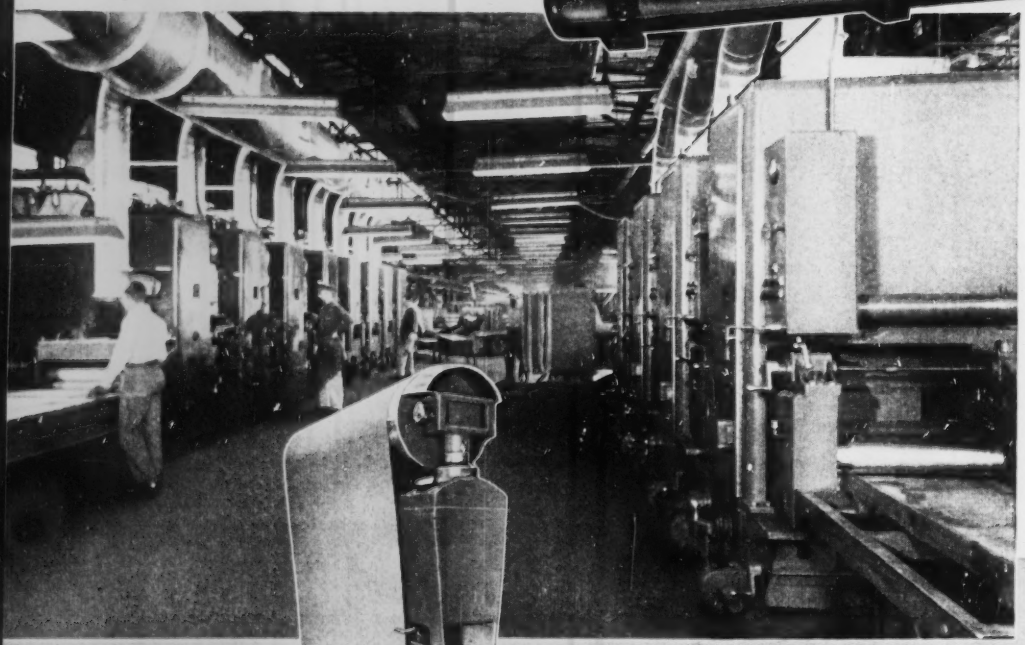
"Hill" Open Side Vertical Spindle Hydraulic Surface Grinders are designed for rapid stock removal and accurate grinding of flat surfaces. Furnished in table widths of 18", 24" and 30"; table lengths 60" to 240".



SHEAR KNIVES

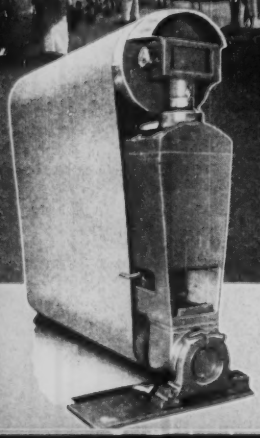
"CLEVELAND" Knives and Shear Blades. Solid and laid steel shear blades; rotary slitting and side trimming knives; metal cutting machine knives.





HORIZONTAL SURFACE GRINDER

"Hill" Open Side Horizontal Spindle Hydraulic Surface Grinders for accurate grinding of flats, angles, irregular and special shaped surfaces. Furnished in table widths up to 36"; table lengths 60" to 240".



ABRASIVE BELT GRINDING AND POLISHING MACHINE

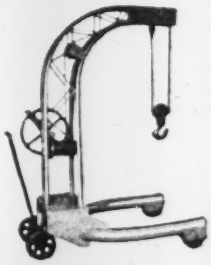
"HILL" 2-Roll Vertical Abrasive Belt ***Pinch Roll Type*** for pre-finishing, conditioning and polishing of sheets, plates, strips or blanked out shapes in flat form. May be used as individual units, or for progressive belt operations in continuous line polishing . . . also made in ***Hydraulic Table Type*** for flat polishing of sheets and plates . . . likewise built in ***Strip Type*** for processing continuous lengths in coiled form . . . furnished in a progression of widths up to 72".

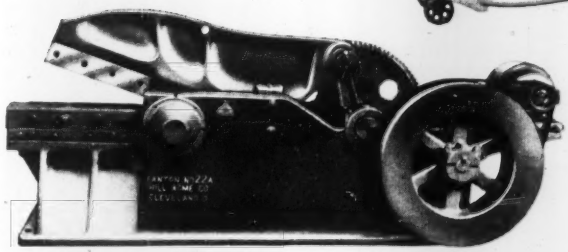
Tools for Industry

HILL ACME TOOLS FOR INDUSTRY

FLOOR CRANE

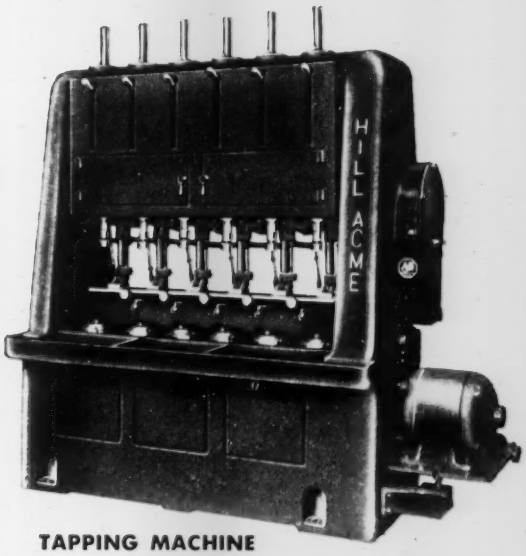
"CANTON" Portable Cranes are constructed of welded steel, with high tensile drop forgings; equipped with self-locking worm as safety feature. Made in 8 sizes from 1 to 3 ton capacity. Fast, safe, one-man operation.





ALLIGATOR SHEAR

"CANTON" Alligator Shears are the most rugged, powerful and trouble free shears ever built for processing scrap. Modern design has produced a stronger shear, with fewer parts, and positive lubrication. Made in a full range of sizes to meet every condition.



TAPPING MACHINE

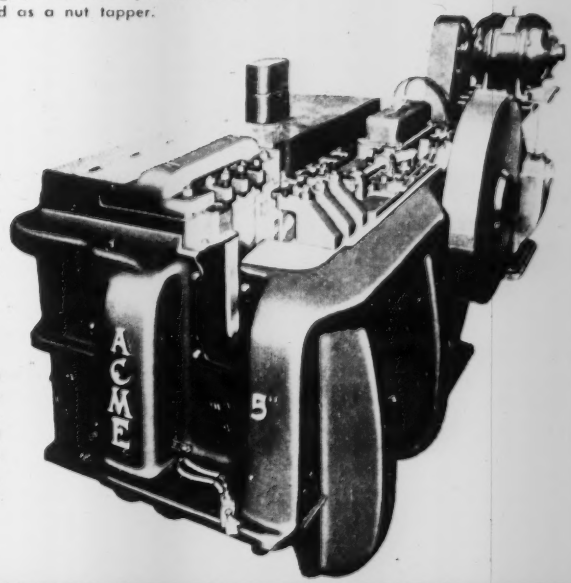
"ACME" model XC-W six spindle Coupling Tapper. Built in 1" capacity and larger, in 4, 6 or 8 spindle. Can be adapted as a nut tapper.

THREADING MACHINE

"ACME" XL Single and Double Spindle Threading Machines are equipped with patented tangent or hob type die head which assures economical, accurate, high speed production. Furnished in sizes from 1" to 3" capacity.

FORGING MACHINE

"ACME" XN Forging Machines produce accurate, quality forgings for long uninterrupted periods. Massive construction and simplicity of operation insure years of trouble-free service. Built in 7 sizes from 1 to 5 inches.



The HILL ACME COMPANY

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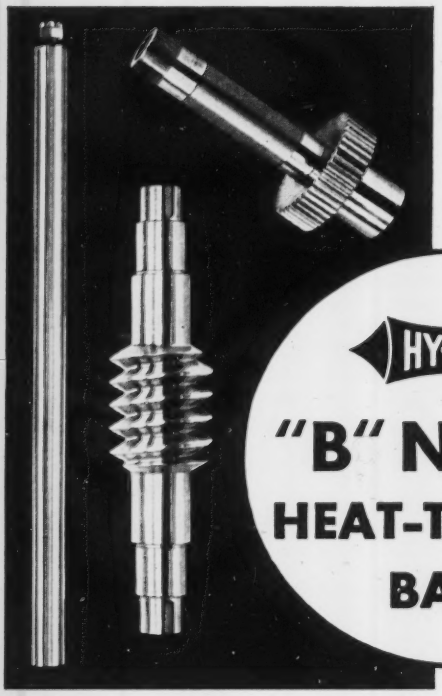

HY-TEN

"B" No. 3X HEAT-TREATED BARS

This higher-priced alloy steel can save you money!

"B" No. 3X heat-treated bars offer many production economies, even though machined at about $^{3}/_{4}$ths the speed of annealed bars. They are supplied to your desired physical properties, and can be machined more easily than standard heat-treated bars with equivalent properties. The expense of scaling, distortion, straightening, and often grinding, are eliminated — as well as the cost of extra handling and heat treating of finished parts!

Although the cost is a little more than for ordinary annealed stock, a trial order will convince you of the true economy of HY-TEN "B" No. 3X heat-treated bars! Just call your nearest WL representative.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

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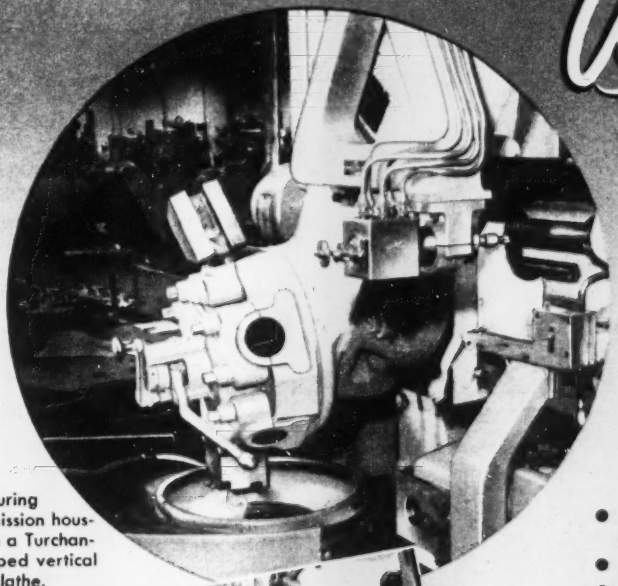
Turchan has what industry needs in the trend to Automation



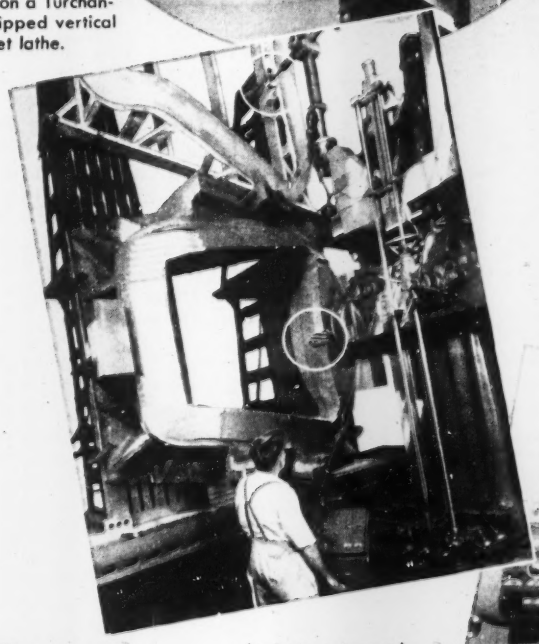
Contouring transmission housing on a Turchan-equipped vertical turret lathe.

MODERNIZE YOUR PRESENT MACHINES WITH TRACER CONTROLS

or replace with completely new tracer-controlled machine tools

- Turchan controls or machine tools modernize your production with automatic duplicating
- Irregular forms machined automatically
- Accuracies to .001" plus finer surface finish
- Completely eliminates chance for rejects
- Reduces production costs up to 1000%
- Requires only standard and conventional tools
- Operator can be trained in a few hours
- Set-up time seldom requires over 30 minutes
- Instantly reconvertible to manual operation

Investigate what Turchan equipment can do for you—send a sketch and specification for job analysis, and full information.



Profiling and countouring large auto body die by Turchan tracer controlled boring mill.

Intricate auto crankshaft being turned by Turchan 45° compound lathe attachment.

Turchan FOLLOWER MACHINE CO.

Machine Tools Division, 8259 Livernois Avenue, Detroit 4, Michigan

For 20 years, designers and builders of automatic hydraulic tracer-controlled equipment for standard machine tools and special machines

(Advertisement)

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FOR YOU?

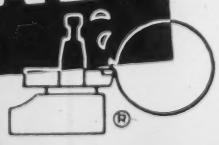
Our view of Kennametal discloses a sound, uniform physical structure that gives promise of consistently good mechanical properties. These are static until put to use on the job—translated into machining advantages for you.

We put more of the best into Kennametal so you may get more of the best out of it.

What is in it for you? Uniform hardness, unusually high strength, great durability. What do you get out of it? Consistent tool performance, long life. These are reflected in time savings on the job, better use of machines, less grinding expense, lower production costs.

Can we prove it? Yes— there are scores of outstanding Performance Reports on a wide variety of Kennametal applications. These are yours for the asking, or we shall be glad to demonstrate by cooperating on any tooling problem in your plant. Our Field Engineers will be glad to help you. Kennametal Inc., Latrobe, Pa.

KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY



KENNAMETAL

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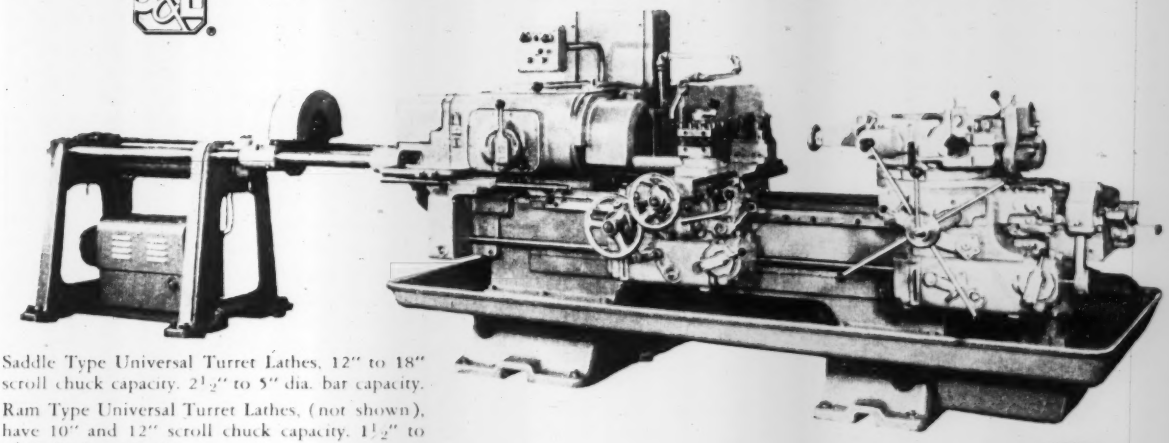
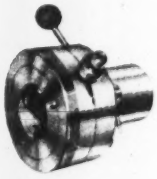
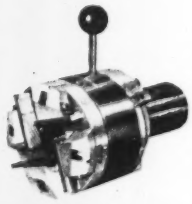


Saddle Type Universal Turret Lathes, 12" to 18" scroll chuck capacity. $2\frac{1}{2}$" to 5" dia. bar capacity. Ram Type Universal Turret Lathes, (not shown), have 10" and 12" scroll chuck capacity. $1\frac{1}{2}$" to $4\frac{1}{2}$" dia. bar capacity.

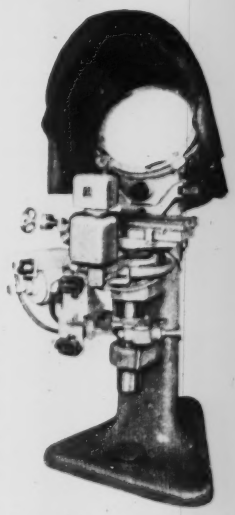


Automatic Opening Die Heads, Radial Chaser Types (above)—Capacities No. 8 through $4\frac{1}{4}$". Tangent Chaser Types (below)—Capacities No. 4 through 2".

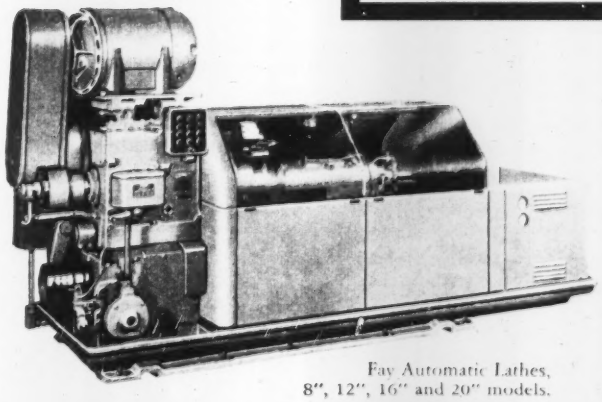


Here in the hills of Vermont originated many of the ingenious tools and techniques which underlie the miracle of modern mass production. The first interchangeable machinery parts, the original rifling machine, the first lever-action repeating rifle, the first flat turret lathe, the first automatic die head, the first optical comparator, the first commercial automatic thread grinder—all are part of J & L's fabulous history.

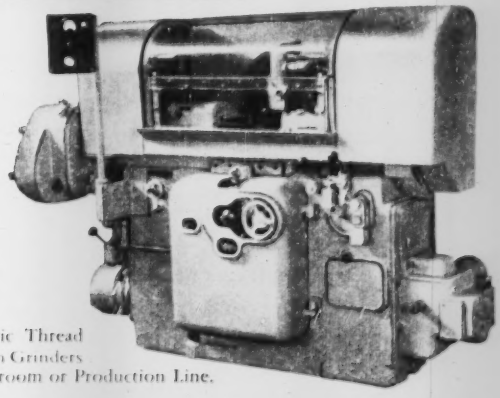
Today, as in the past, Jones & Lamson is dedicated to the furtherance of America's industrial efficiency. J & L products, and the men behind them, are actively helping industry produce better products, in greater quantity, for less.



Optical Comparators, Pedestal type (shown) and Bench type. For Toolroom, Production Line and Laboratory.



Fay Automatic Lathes, 8", 12", 16" and 20" models.



Automatic Thread and Form Grinders for Toolroom or Production Line.

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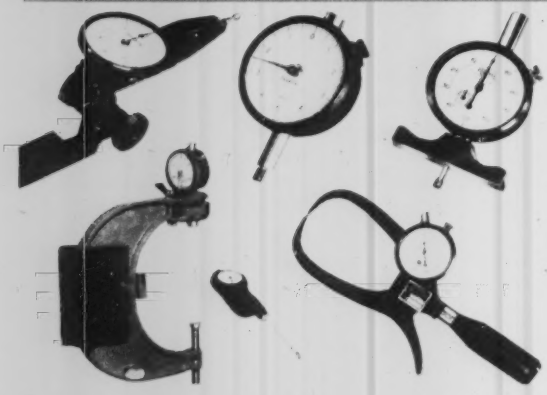
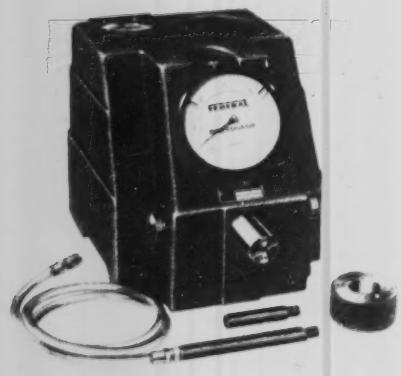


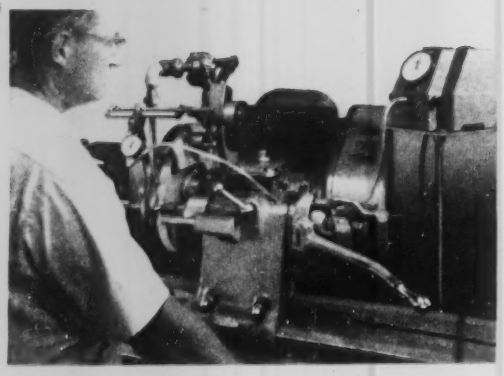
Indicators — over 80 different models, ranges, sizes, graduations, styles — for every accuracy, space, and visibility requirement. Indicating Gages of all types including snap, hole, depth, caliper, etc., and special.

DIAL INDICATORS AND GAGES



Federal Dimensionair: Greatest measuring range of any air gage — .003" with 2500 to 1 magnification. Most modern air gage. Available in various applications and combinations with Electrical and Electronic gages. *Send for new complete catalog.*

AIR GAGES



Grinding operations automatically and consistently size controlled — with exceptional accuracy. Also bare wire, insulated wire, glass tubing, steel rods, sheet, and similar continuous material is not only gaged in process but size-controlled by automatically adjusting the machine to compensate for variations out of tolerance.

MACHINE CONTROL GAGES

Call us in on the job when you start planning your gage requirements. We have helped many plants solve their gaging problems and we can help you too. Let us know your requirements. Federal Products Corporation, 2110 Eddy Street, Providence 1, Rhode Island.

has *Everything* in Gages for Dimensional Control

Multiple dimensions inspected simultaneously and quickly. (1) A single or individual light indicates at a glance if one or more dimensions are wrong. Or (2) separate lights identify incorrect dimensions and indicators show *how much*.

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Invaluable for selective assembly methods of production. Parts are measured and sorted into any number of dimensional categories with great accuracy and speed. 100% inspection without interfering with production schedules. Semi-automatic or hand fed.

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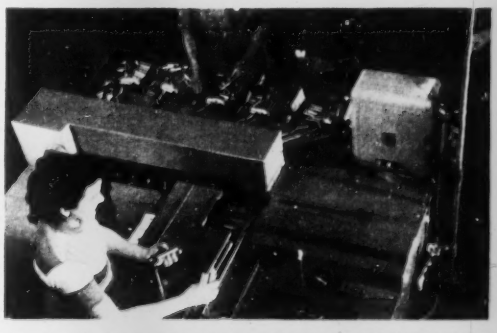

Federal can process engineer, design, and build complete sets of gages for any production job: Can often save money for you by modifying *stock* gages. Consult Federal before you process your next job. Save time and money and get better gages.

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Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL INDICATING GAGES

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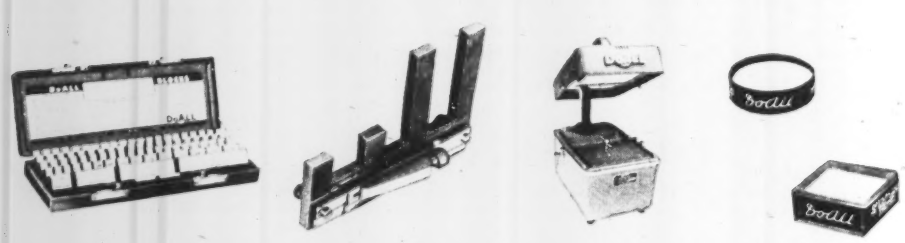
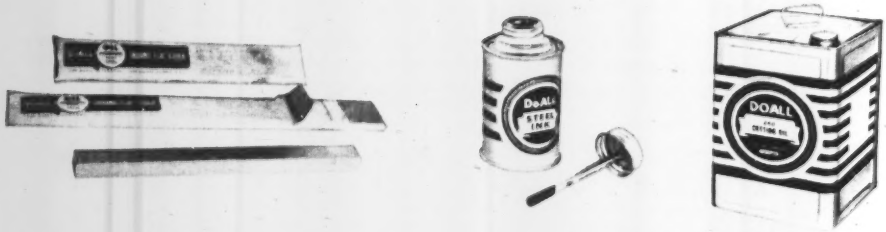


GAGE BLOCKS...MICRO-STEP GAGING SYSTEM...MONOLIGHTS...

METALWORKING NECESSITIES



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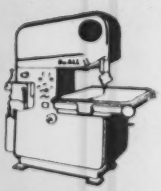
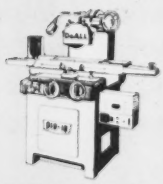


BAND MACHINES



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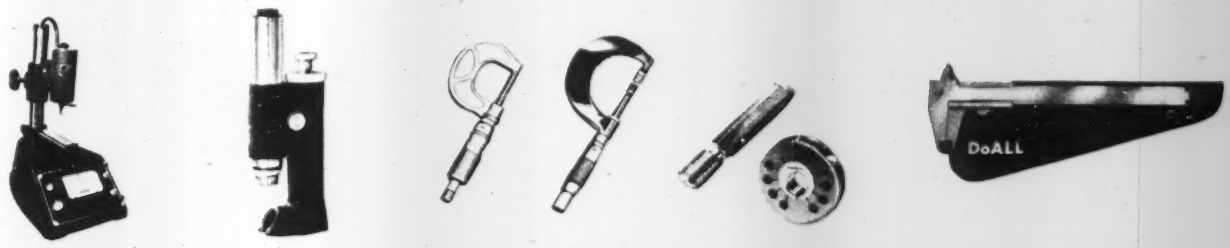

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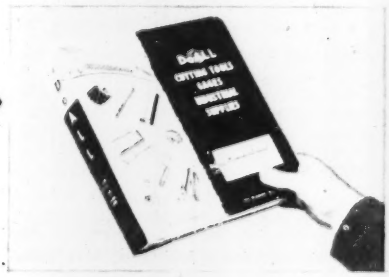

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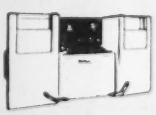
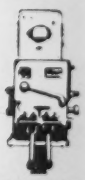
BAND FILERS

JIG FILERS



HEAT TREAT UNITS



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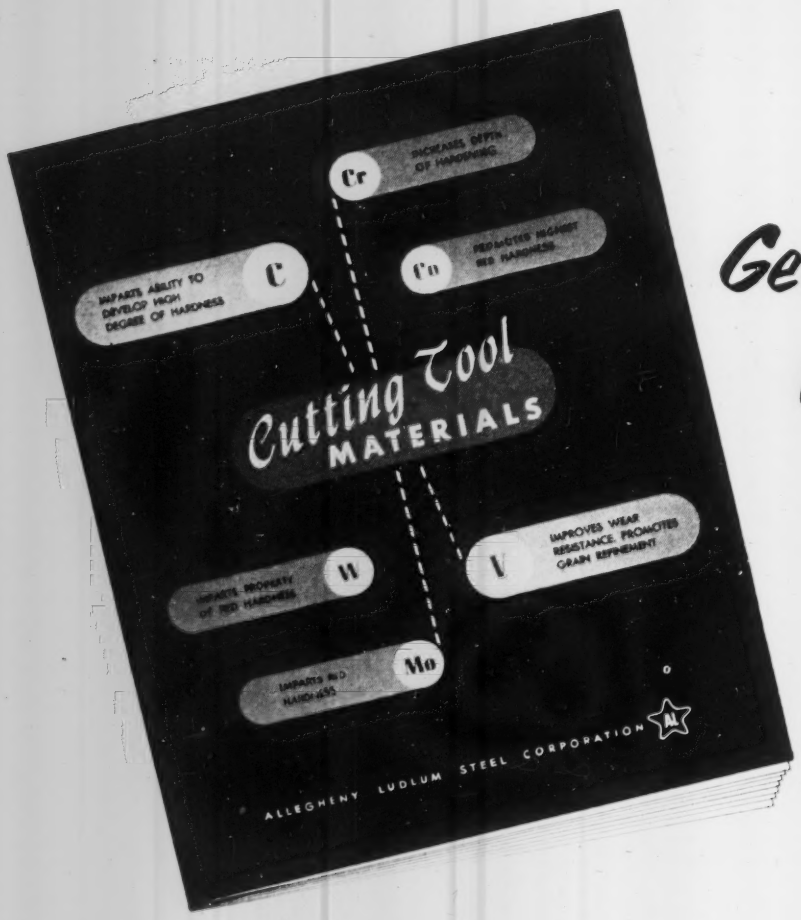

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By "complete" is meant that Allegheny Ludlum produces the full range of modern cutting tool materials, hence is in position to know and recommend the type best suited for any stated purpose. Unbiased content makes the 8½" x 11" booklet, shown, all the more valuable. Specify its title, "Cutting Tool Materials."

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You should have a personal copy of this 36-page booklet close at hand, if you are continually running into new cutting problems. Use it as a guide to quick answers to scores of possible questions such as:

"Should we use *Carbide* on this job? What grade?" . . . or, "How about tooling up with *Cast Alloy* for that other run?" . . . or, "Can we cut this extra-tough stock fast enough with our usual grade of *High Speed Steel?*"

This booklet in no way replaces, but does supplement, what you can learn by practical experience or what you can gain by calling in an A-L tool engineer. In compact form and quite impartially, the booklet presents the basic facts that enable you to speedily compare the suitability of various tool materials for specific uses. *Send today for your free copy.* There is no obligation involved.

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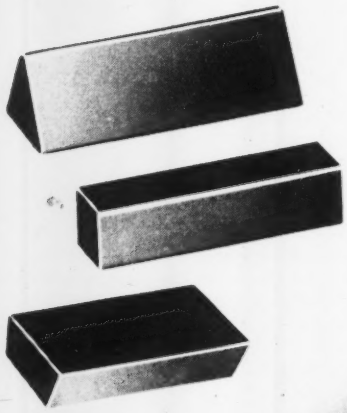
A NEW CARBOLOY CREATED-METAL

A heavy-duty carbide capable of cutting more cubic inches of steel per minute, with longer tool life, than existing carbides

. . . speeding your heavy-duty steel-cutting jobs up to 30 percent!

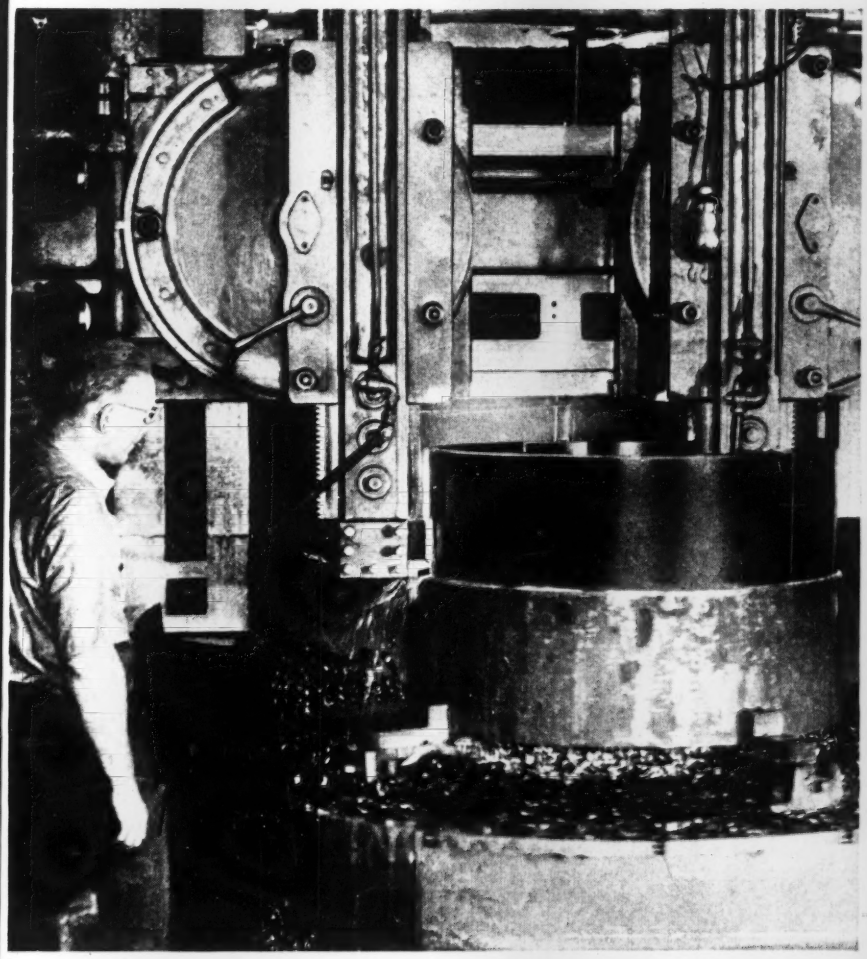
GRADE 370
The first of a new family
—Series 300—
of steel-cutting carbides



GRADE 370
CARBOLOY
CEMENTED CARBIDE

It's Grade 370 Carboloy Cemented Carbide — the first of an entirely new series specially developed for taking heavy cuts in steel at higher speeds. Unique grain structure lets it cut at around 1800° F without deforming — *higher than ever before practical* with any carbide. Tests and on-the-job applications indicate that Grade 370 can increase performance on many higher speed steel-cutting jobs by up to 30%. Now available in selected standard sizes and shapes.

"Carboloy" is the trademark for the products of Carboloy Department of General Electric Company



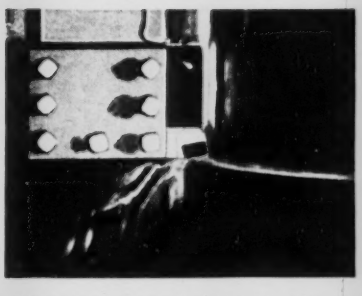
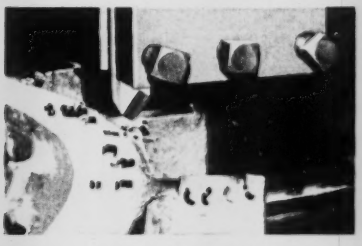


Photo at left and close-up, above, show Grade 370 taking a cut $\frac{1}{2}$" deep, in large generator retaining ring of cast-alloy steel. The ring is machined at 110 FPM with .048" feed – causing tremendous heat to build up at the cutting edge. Grade 370 holds its shape and cutting edge under these tough conditions. Tool life increased 50%.



Above, Grade 370 machining generator stator frame. On this job a $\frac{1}{2}$"-deep interrupted cut is made at a speed of 80 FPM with a .024" feed. Grade 370 continues to cut for longer periods under the constant jarring and high temperatures. Tool life increased 50%.

Grade 370 is the first of a new cemented carbide series tailor-made for today's *and tomorrow's* most severe metal-cutting conditions. The result of a quarter century of research- and development-pioneering in created-metals by the Carboloy Department.

MORE PERFORMANCE FOR YOUR DOLLAR

Its cutting superiority has been proved both in Carboloy laboratories and on tough on-the-job customer applications. On rolls, gun barrels, locomotive wheels and other heavy-duty operations, tools tipped with Grade 370 take heavier cuts at higher speeds and withstand higher temperatures than ever before practical – and this is done with even longer tool life than existing carbides. Tools cut more cubic inches of steel per minute . . . production goes up as much as 30%.

BUILT-IN TIP RIGIDITY

Exhaustive tests by Carboloy engineers showed that on heavy-duty, high-temperature machining applications where heavy pressure is encountered, other tools failed because the cutting edges deformed. Grade 370 is made from start to finish with a new, carefully controlled manufacturing process which gives it a built-in structural rigidity to resist this deformation – even at temperatures of around 1800° F.

AVAILABLE NOW

Grade 370 is available immediately in a number of sizes and shapes. Write today for additional information and for free technical literature. Carboloy Engineering Appraisal Service will work with you on specific applications.

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Gentlemen: Rush me, at no cost or obligation, all facts now available on your new Grade 370 Carboloy Cemented Carbide.

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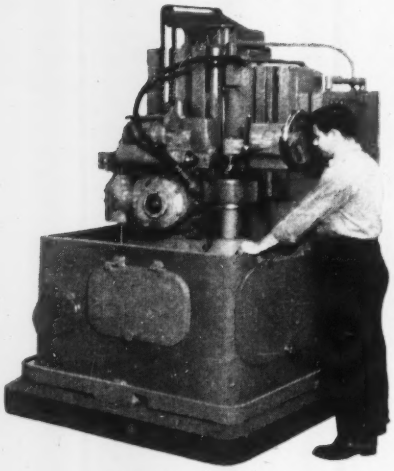
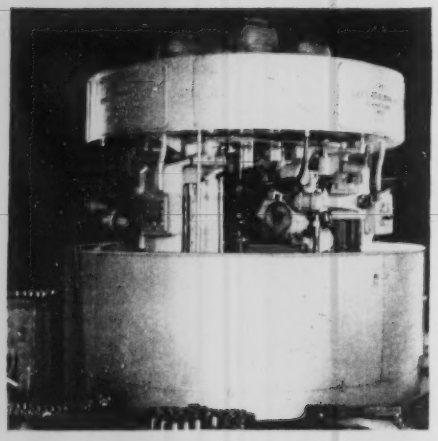
MODEL 12S SEMI-AUTOMATIC HOBBER

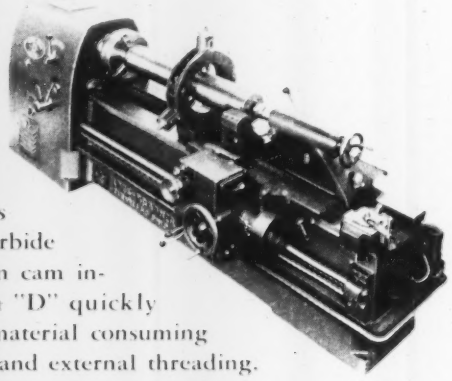
This sturdy gear hobbing machine with the Lees-Bradner hob shifter and in-out mechanism produces gears of maximum accuracy—including right or left hand spur and helical gears up to 45°. After loading it is necessary only to press the starter button and the job is fed automatically across the face of the work.





MODEL 7A 4-SPINDLE HOBBER

A truly amazing hobbing machine that brings touch button control to precision hobbing. One operator can easily load and unload the four, six or eight spindle machines. Equipped with Lees-Bradner in-out mechanism and electric hob shifter. Also available in single spindles.



CRI-DAN "D" SINGLE POINT THREADER

This amazing threading machine is capable of 50 cuts a minute—this is accomplished with a single point carbide cutting tool which is controlled by a high precision cam instead of the conventional lead-screw. The Cri-Dan "D" quickly and accurately threads parts that are time and material consuming or even impossible on a turret lathe. Both internal and external threading.

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And no matter which Crucible warehouse you buy from, you can be assured that each piece will be of uniform quality. For Crucible is a fully integrated steel manufacturing operation, with 100% control over quality through each phase of production — from mining and melting to the last step of processing.

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hydraulic drive . . . ***a natural for***

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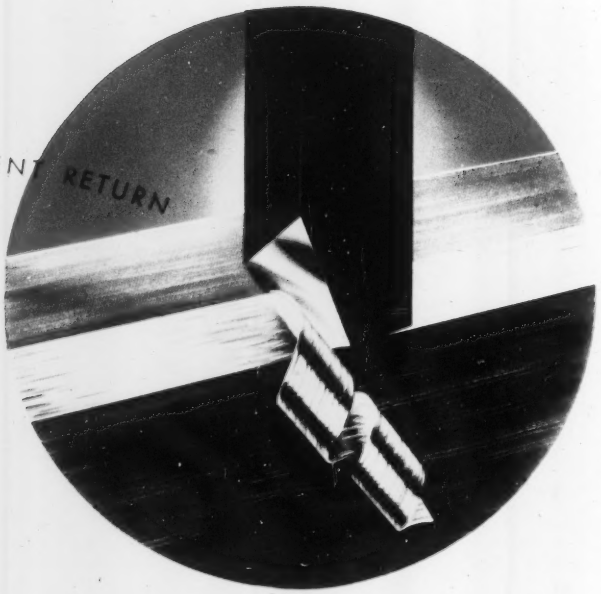
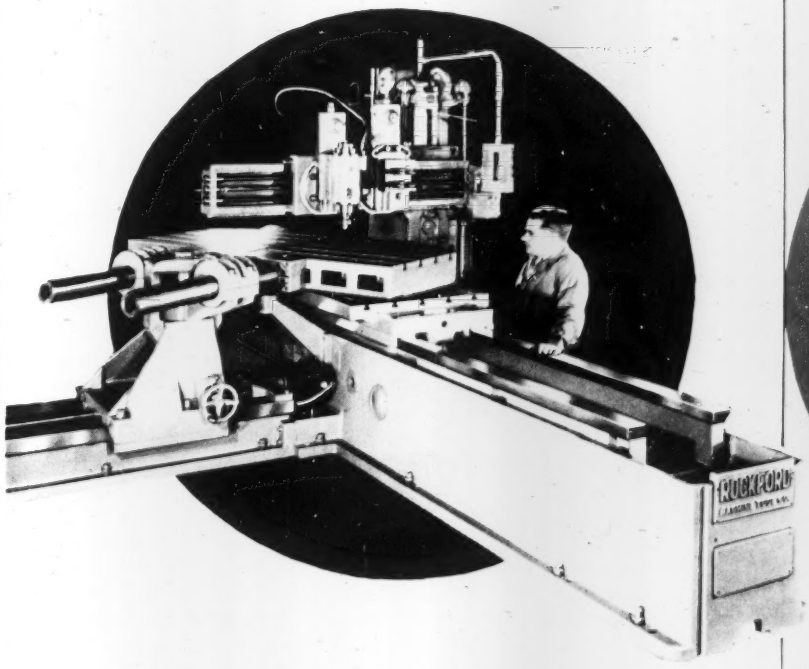


Rockford Machine Tool Co.

reciprocating machine tools

Hydraulic Drive and Feeds, as basic features in modern machine tool design, provide outstanding performance, measured in terms of work quality, high production and low operating cost. We have had over 25 years of experience in applying Hydraulic Drives and Feeds to Shapers, Planers and Slotters.



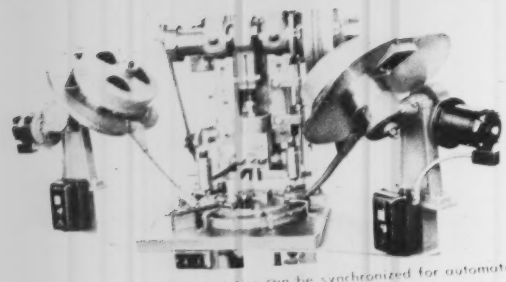
rockford hydraulic special machines

Rockford Hydraulic Driven Machine Tools may be arranged for special applications, such as this Radius Planer for accurately machining radii from 20 inches to 24 feet. A sub-table is pivoted upon the standard table and is actuated by "arms" from an adjustable center. The center is positioned by power and equipped with a vernier scale for easy, accurate calibration of the radius to be machined. In addition to the conventional planing head, a grinding head is furnished for accurately finishing the radii surfaces.

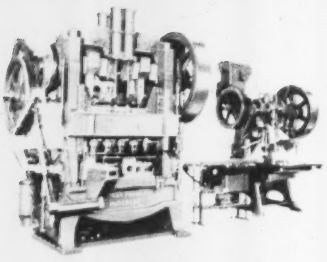
shaping / planing / duplicating / turning

our 51st year

Rockford, Illinois



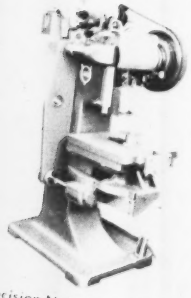
Hopper feeds in all their varieties can be synchronized for automatic operation on a V & O long slide high precision press.



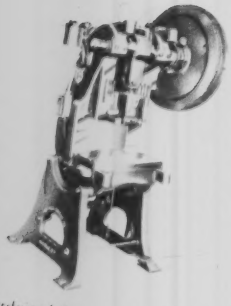
Two presses, synchronized to work as one. V & O long slide precision makes this possible.

High precision even at 250 strokes per minute, because of applications of the long slide principle.

BUILT UPON A HIGH PRECISION PRINCIPLE



Precision Notching: "the operation that no press could do", is made simple by V & O long slide precision

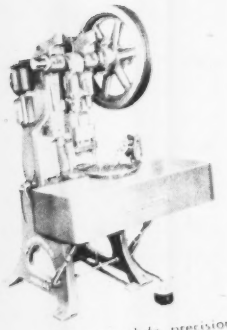


Sturdyized long slide precision

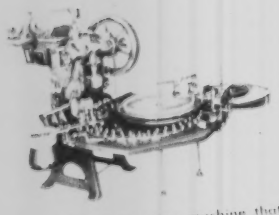
Every feature of every V & O Press stems from and contributes to the high precision which is inherent to the V & O long slide principle. Long life of tooling, high flexibility of automation and wide adaptability for accessories, all are made practical by this principle.

Every element of every V & O design is sturdyized so that the long slide precision values cannot be lost over a long working life. Sturdy precision with easy adaptability is the reason why V & O presses are so often developed into specialized production machines.

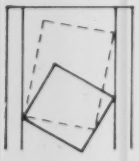
An application engineer who can tell you the whole story is right near you. Write us and ask him to call, please.



Sturdyized long slide precision Feed-O-Matic high precision, high safety feeding worked perfectly with a long slide precision press.

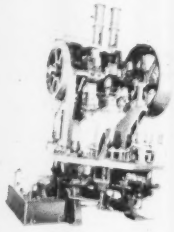


A complete production machine that is run by 3 operators, each of whom has his own emergency stop button.



WHY THE V & O LONG SLIDE PROVIDES BETTER ALIGNMENT

With the same running clearance, the longer the slide the less the possibility for angular misalignment. And we keep our running clearances very close indeed.



Special dial feeds are readily applied when the press has sturdyized long slide precision with which they can work.

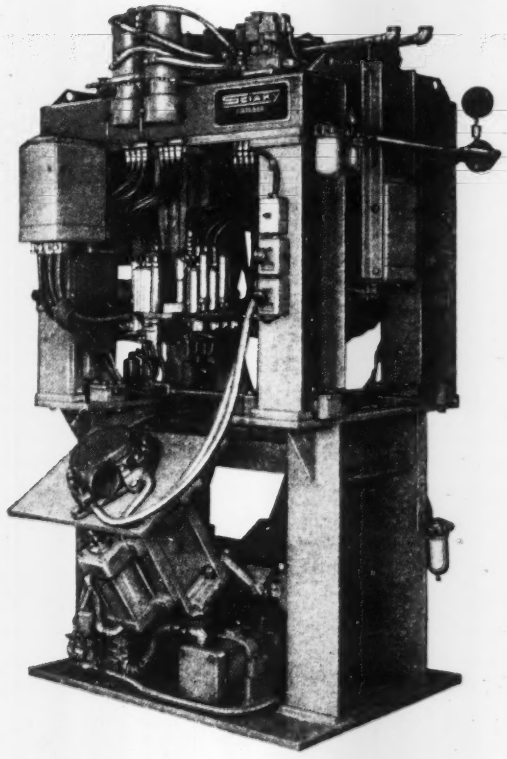
THE V & O PRESS COMPANY

DIVISION OF EMHART MFG. CO.

HUDSON, NEW YORK

BUILDERS OF PRECISION POWER PRESSES AND FEEDS SINCE 1884

NEW
HIGH PRODUCTION WELDER
READILY ADAPTABLE TO
PRODUCTION CHANGES



The Sciaky Standard SX Electric Resistance Welder equipped as a 36 Gun Unit for welding blower housings at the rate of 500 per 50 minute hour.

New Sciaky Standard Multiple Gun Welder Designed for Wide Variety of Production Applications

High production, multiple gun applications no longer require uneconomical C-frame type electric resistance welding machines with special tooling, or complex, specially designed, one-job machines.

Now, Sciaky, pioneers and inventors of electric resistance welding machines, offers a standard multiple gun welder that can be readily adapted for production changes within the capacity of the machine.

The Sciaky SX Welder, a dual platen unit, mounts simple superstructure providing for different arrangements of standard transformer, booster, and welding electrode units.

With approved J. I. C. controls, and featuring either independent or simultaneous dual platen operation, the Sciaky SX Welder offers all the advantages of high production, precision welding, *plus* the tremendous economies of adaptability to production changes.

For complete information, write for Bulletin 313-12.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY

Plants: Chicago • London • Paris Sales Offices: Chicago, Ill. • Buffalo, N. Y. • Cleveland, Ohio • Dayton, Ohio • Detroit, Mich. • Ft. Worth, Texas • Hollywood, Calif. • New York, N.Y. • Philadelphia, Pa. • Washington, D.C.

USE MOTCH & MERRYWEATHER ENGINEERING

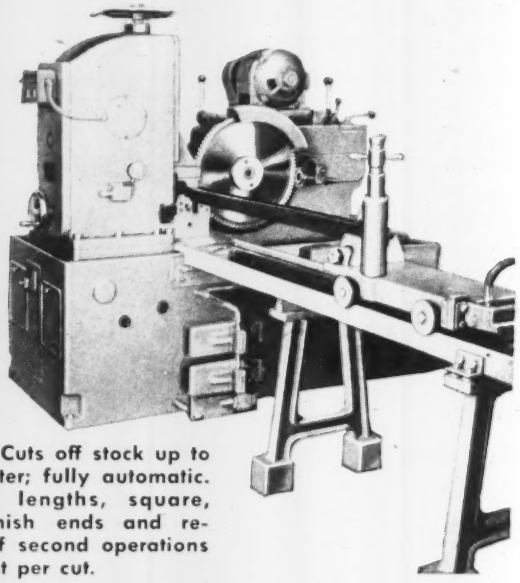
NO LET-UP. **Whether in a war-time or peace-time economy, America's levels of effective production must be sustained and raised. New highs must be reached and surpassed. Constant advances in machine tool purpose and design must promote the nation's industrial progress. To these ends Motch & Merryweather engineering is continuously directed. Typical machines are illustrated here.**

MOTCH & MERRYWEATHER Circular Sawing Machines

to cut off every size and shape of stock, ferrous or non-ferrous.

Four other sizes for cutting off stock; blades up to 96" diameter.

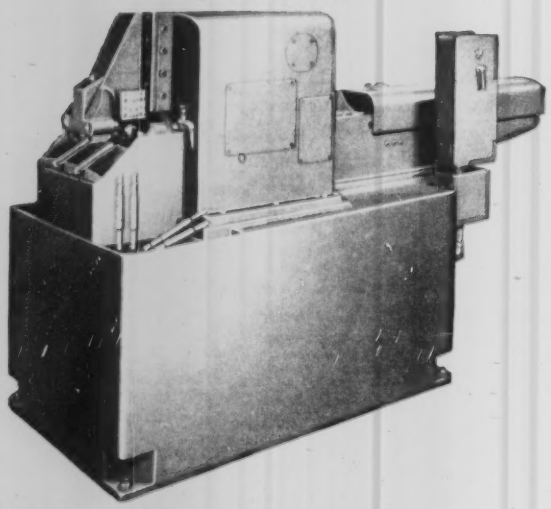
No. 00-G Automatic cuts off stock up to 3" diameter, straight or at angles up to 45°.



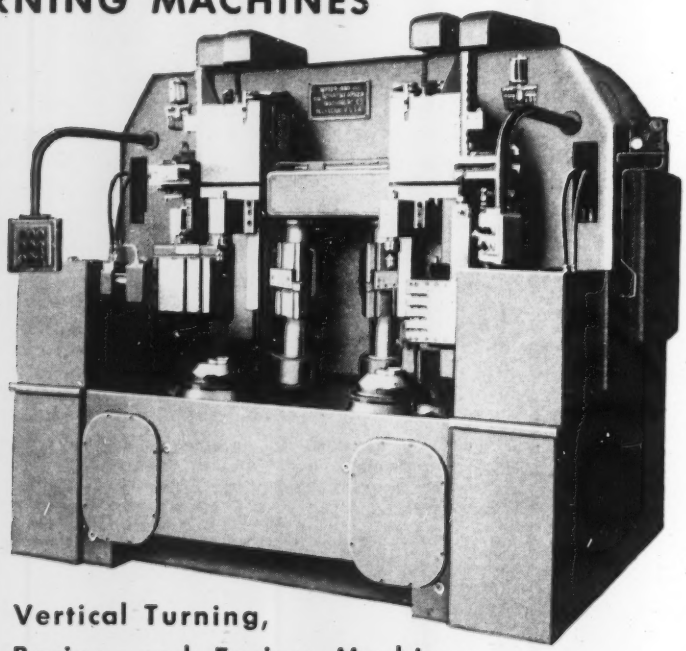
No. 2-A. Cuts off stock up to 6" diameter; fully automatic. Accurate lengths, square, milled finish ends and reduction of second operations lower cost per cut.

Motch & Merryweather TURNING MACHINES

Cam Automatic Forming Machines



Single- and double-spindle models. Hopper loading or bar feeds. All movements actuated by single cam shaft.

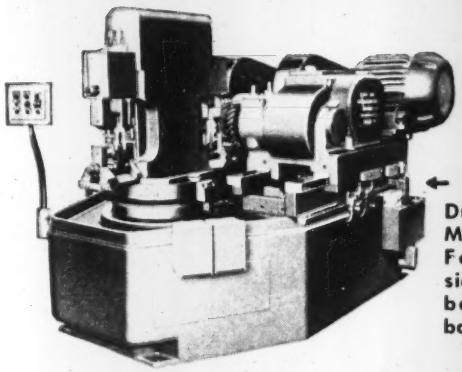


Vertical Turning, Boring and Facing Machines

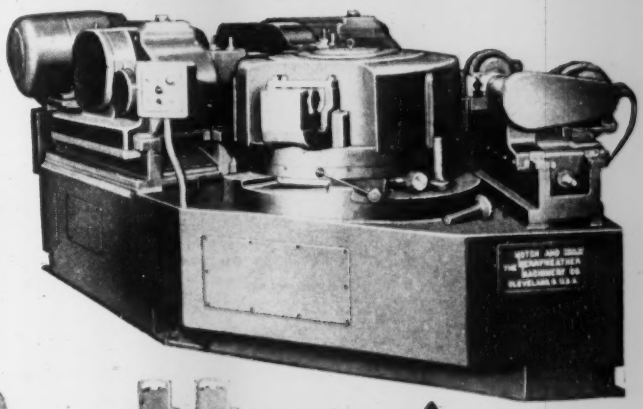
Single- or double-spindle. Multiple tool blocks hydraulically fed with automatic sequence for maximum metal removal.

FOR NEW POTENTIALS IN ADVANCING PRODUCTION

Heavy Duty Production Milling Machines

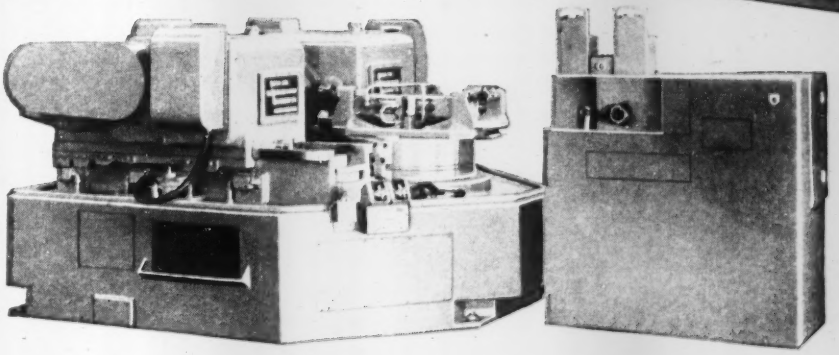


Duplex Production Milling Machine. Face mills both sides of tractor side bars. Up to 268 bars per hour.



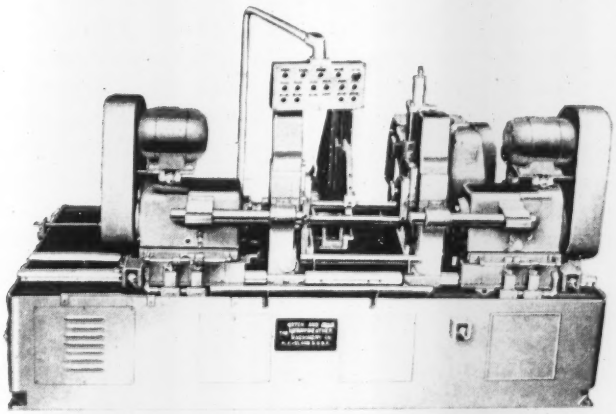
Milling and center drilling unitized. Face mills and center drills both ends of pinion shaft. Up to 230 shafts per hour.

Weight-balance milling machine unitizes weighing and subsequent metal removal. Face mills weight boss on each end of automotive connecting rod. Up to 300 pieces per hour.

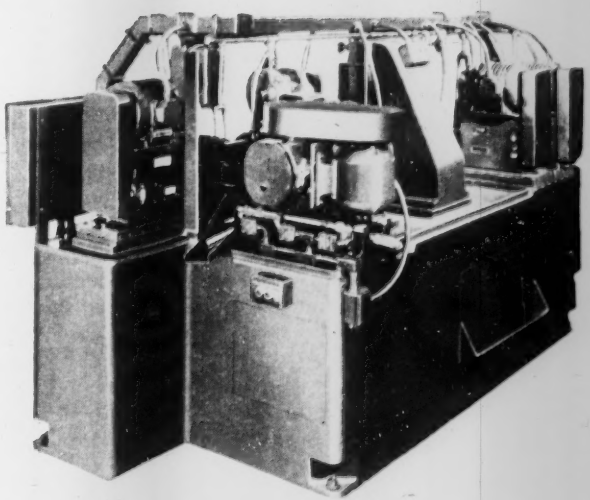


M. & M. TRANSFER MACHINES

for bar stock cut-off and double-end machining, tailored for individual requirements.



Cut-off operation simultaneous with double-end machining. Models for stock ½" through 6" diameter, lengths 8" through 40". Many forms and combinations of double-end machining.



Unusual combination of machining operations in one unit: drill, countersink, broach, cut-off, chamfer.

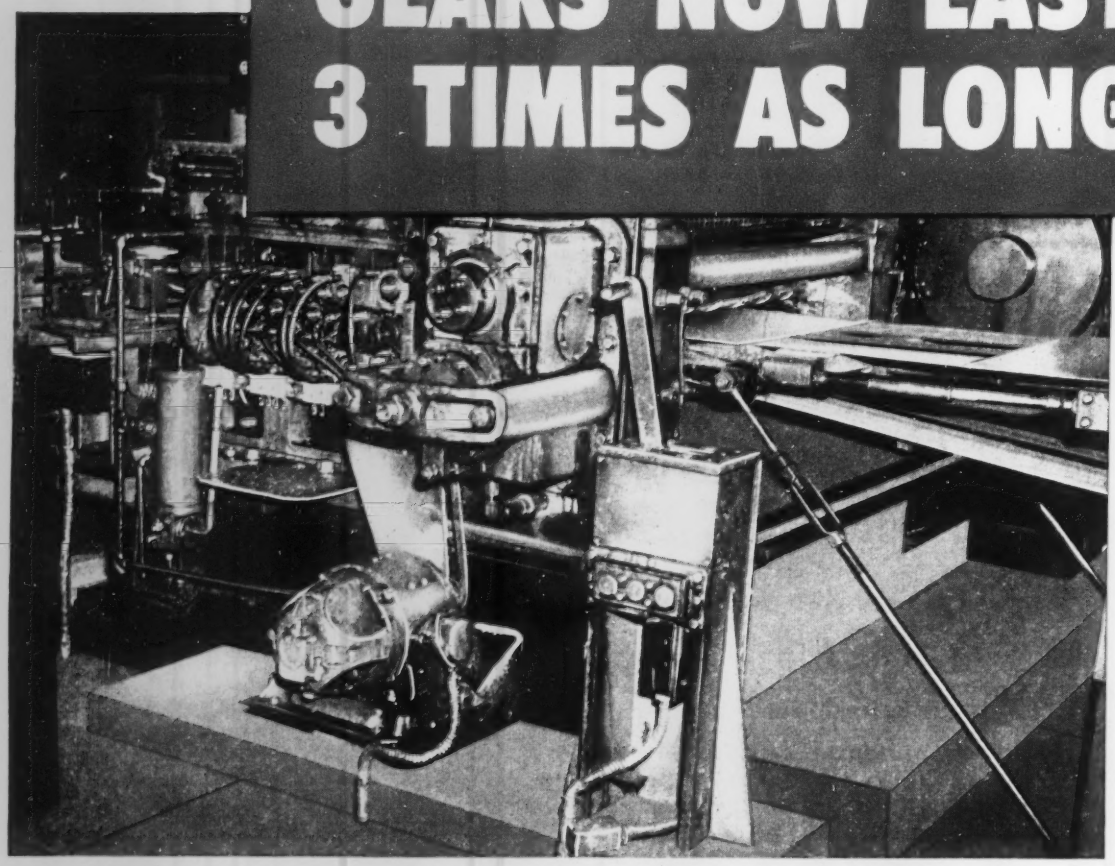
Manufactured by — THE MOTCH & MERRYWEATHER MACHINERY CO. —

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

WEIRTON'S SHEAR GEARS NOW LAST 3 TIMES AS LONG



The Situation: Weirton Steel Company, Weirton, W. Va., was having trouble with the gears of seven Hallden tin plate shears. Gears were pitting badly and running so hot that a continuous vapor rose from the vent. Gear life was only about five months.

The Remedy: A Texaco Lubrication Engineer was called in, asked to study the problem. He recommended *Texaco Meropa Lubricant* and the lubricant on one shear drive was changed over as a test.

The Results: Improvement in performance with *Texaco Meropa Lubricant* was so marked that within six months the other six shears were also changed over. The average life of the gears is now eighteen months.

Wierton's experience typifies the ideal protection *Texaco Meropa Lubricant* affords enclosed gears of every type. The EP properties of *Texaco Meropa Lubricant* are especially long-lasting and are not affected by high operating temperatures. *Texaco Meropa Lubricant* does not separate, thicken or foam. It is not affected by moisture. It is highly resistant to oxidation and non-corrosive to bearings.

Let a Texaco Lubrication Engineer give you all the facts. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write;

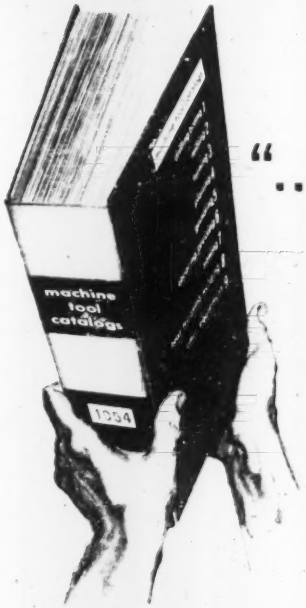
☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES



"...a great time saver"

The following manufacturers of machine tools and accessory equipment have placed their catalogs in MACHINE TOOL CATALOGS to make it easier for you to consult them without delay, any time you want information about their products.

Abrasive Machine Tool Co.
Allis-Chalmers Mfg. Co.
Armstrong-Blum Mfg. Co.
Armstrong Bros. Tool Co.
Arter Grinding Machine Co.
Behr, Joseph, & Sons, Inc.
Besly-Welles Corp.
Boyer-Schultz Corp.
Brown & Sharpe Mfg. Co.
Bryant Chucking Grinder Co.
Bullard Co.
Campbell Machine Co., (Div. American Chain & Cable Co.)
Carlton Machine Tool Co.
Cincinnati Gilbert Machine Tool Co.
Cincinnati Lathe & Tool Co.
Cincinnati Milling Machine Co.
Cleveland Crane & Engineering Co.
Colonial Broach Co.
Cone Automatic Machine Co., Inc.
Consolidated Machine Tool Corp. (Sub. Farrel-Birmingham Co., Inc.)
Crane Packing Co.
Dake Engine Co.
Davis & Thompson Co.
Federal Products Corp.
Fosdick Machine Tool Co.
General Mfg. Co.
Giddings & Lewis Machine Tool Co.
Gisholt Machine Co.
Gleason Works
Greaves Machine Tool Co.
Greenlee Bros. & Co.
Hall Planetary Co.
Heald Machine Co.
Hydro-Borer Co.
Innocenti
Johnson Machine & Press Corp.
Jones & Lamson Machine Co.
Kearney & Trecker Corp.
Kent-Owens Machine Co.
Knight, W. B., Machinery Co.
L & J Press Corp.
Landis Tool Co.
LeBlond, R. K., Machine Tool Co.
Lucas Machine Div., New Britain Machine Co.
Micromatic Hone Corp.
Monarch Machine Tool Co.
Motch & Merryweather Machinery Co.
National Conveyors Co., Inc.
Nebel Machine Tool Co.
New Britain Machine Co., New Britain-Gridley Machine Div.
Norton Co.
Ohio Crankshaft Co., (Tocco Div.)
Ohio Machine Tool Co.
Oliver Instrument Co.
O'Neil-Irwin Mfg. Co.
Osborn Mfg. Co.
Plan-O-Mill Corp.
Reid Bros. Co., Inc.
Rivett Lathe & Grinder, Inc.
Rodger Hydraulic, Inc.
Rowbottom Machine Co.
Sciaky Bros.
Seneca Falls Machine Co.
Sheffield Corp.
Sheldon Machine Co., Inc.
Sidney Machine Tool Co.
Struthers-Wells Corp.
Sundstrand Machine Tool Co.
Swift Electric Welder Co.
Taft-Peirce Mfg. Co.
Thomas Machine Mfg. Co.
Torit Mfg. Co.
Troglia Fratelli, Sas
Turnchan Follower Machine Co.
Verson Allsteel Press Co.
Wade Tool Co.
Wales-Strippit Corp.
Warner & Swasey Co.
Wells Mfg. Corp.
Westinghouse Electric Corp.

Sweet's Catalog Service

Division of F. W. Dodge Corporation
119 WEST 40TH STREET, NEW YORK 18, N. Y.

How to Use the Guide

The Machine Tool Buyers' Guide is designed to help you, the machine tool user, determine the source or sources for various types of machine tools.

To use the Guide, first check the complete index beginning on the opposite page for the types of machine tools you need. You will notice the machine tools are listed in 12 general categories and then by specific types. After determining the pages for the specific types in which you are interested, refer to the pages in the Guide.

Information at the left of the columns designates the machine size. This is often followed by a brief description. The code number in the column on the right designates the producer of the machine. When several producers manufacture the same size machine, these are listed in alphabetical order. Index to these producers, together with their code numbers, appears on page 82.

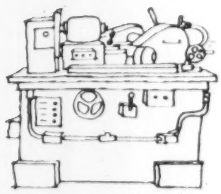
Each listing in the Guide may actually represent several different models produced by the manufacturer.

An example of this might occur where a manufacturer makes an engine lathe of a given capacity, but in several different horsepower ranges, or with several different speed or feed ranges available. In this case, these several different models with the same swing and center distance are listed as one machine. Consult the manufacturers for more specific information.

Once you have determined the type of machine you need to do a job, and its general size or capacity, follow these steps in putting the Guide to work for you:

FOLLOW THESE STEPS

1. **Refer to the index of machine tools on the opposite page.**
2. **Turn to the pages indicated for the proper listings.**
3. **Select the machine tools you are interested in, and note the manufacturer's code number at the right of each listing.**
4. **Refer to the key on page 82 for the names of those companies whose code numbers you have noted or, check the list of companies at the beginning of each section.**



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A1 Abbey Etna Co. 3100 Maplewood Ave., Toledo 10, O.	9
A2 Abrasive Machine Tool Co. Dexter Rd., East Providence, R. I.	4,7
A3 Ace Central States Machine Tool Co. 3801 Trenton St., Detroit 10, Mich.	12
A4 Acme Machinery Div. Hill Acme Co., 1201 W. 65th St., Cleveland 2, O.	11,12
A5 Acme Mfg. Co. 1400 East Nine Mile Rd., Detroit 20, Mich.	4,5
A6 Acromark Co. 9-13 Morrell St., Elizabeth 4, N. J.	12
A9 Aircraft Machinery Corp. 8701 Lookout Mt. Ave., Hollywood 46, Calif.	7
A12 Charles G. Allen Co. Barre, Mass.	1,11
A13 American Broach & Machine Co. Div. of Sundstrand Machine Tool Co. Ann Arbor, Mich.	2,4,12
A14 American Chain & Cable Co. Inc. Campbell Machine Div. Bridgeport 2, Conn.	9
A15 American Instrument Co. 8010-8030 Georgia Ave., Silver Spring, Md.	9
A17 American Tool Works Co. Pearl St. at Eggleston Ave., Cincinnati 2, O.	1,6
A19 Armstrong-Blum Mfg. Co. 5700-5800 W. Bloomingdale Ave., Chicago 39, Ill.	9
A20 Arter Grinding Machine Co. Ia Sagamore Rd., Worcester 5, Mass.	4
A21 Atlas Press Co. 1915-2023 N. Pitcher St., Kalamazoo, Mich.	1,4,6,7,10
A22 Auto Engraver Co. P.O. Box 366, Ridgefield, Conn.	7
A25 Avey Drilling Machine Co. Cincinnati 1, O.	1
A26 Axelson Mfg. Co. Div. of Pressed Steel Car Co. Inc. 6160 S. Boyle Ave., Los Angeles 58, Calif.	6
B1 Baird Machine Co. 1700 Stratford Ave., Stratford 9, Conn.	1,6,7
B2 Baker Brothers Inc. Station F, P.O. Box 101, Toledo 10, O.	1,4,12
B3 Baldor Electric Co. 4351-67 Duncan Ave., St. Louis 10, Mo.	4,5
B4 Baldwin-Lima-Hamilton Corp. Hamilton Div. 545 North Third St., Hamilton, O.	1,6,8,12
B5 Baldwin-Lima-Hamilton Corp. Eddystone Div. Philadelphia 42, Pa.	8
B6 Barber-Colman Co. 261 Loomis St., Rockford, Ill.	3,4
B7 Bardons & Oliver Inc. 1133 W. 9th St., Cleveland 13, O.	6,9
B8 Barnes Drill Co. 814-830 Chestnut St., Rockford, Ill.	1,4,12
B9 W. F. & John Barnes Co. 301 S. Water St., Rockford, Ill.	1,4,7,12
B10 Barney Machinery Co. Martin Bldg., 119 Federal St., Pittsburgh 12, Pa.	6
B11 Barrett Machine Tool Co. Meadville, Pa.	1,12
B12 Baush Machine Tool Co. 136 Wilson Ave., Springfield 7, Mass.	1,11
B13 Beaver Pipe Tools Inc. 3419 Dana St., Warren, O.	11
B14 Benchmaster Mfg. Co. 1833 W. Rosecrans Ave., Gardena, Calif.	7
B16 Besly-Welles Corp. Beloit, Wis.	4
B17 Bett Marr Mfg. Co. 621 E. Excelsior Blvd., Hopkins, Minn.	9
B19 H. Bickford & Co. 1092 Union Ave., Lakeport, N. H.	1
B20 Bignall & Keeler Div. of John Ramming Machine Co. 1491 McRee Ave., St. Louis 10, Mo.	4,11
B21 Bilgram Gear & Machine Works 1221 Spring Garden St., Philadelphia, Pa.	3
B23 Black & Decker Mfg. Co. Towson 4, Md.	4
B24 Black Diamond Saw & Machine Works Inc. 515-5 North Ave., Natick, Mass.	4,9
B25 Black Rock Mfg. Co. Bridgeport 6, Conn.	4
B26 Edward Blake Co. 437 Cherry St., West Newton 65, Mass.	4
B27 Blanchard Machine Co. 64 State St., Cambridge 39, Mass.	4
B28 Blaw-Knox Co. Blaw-Knox, Pa.	6
B30 J. G. Blount Co. Everett 49, Mass.	4,5
B31 Bodine Corp. 321 Mountain Grove St., Bridgeport 5, Conn.	1,11
B32 Henry P. Boggis & Co. 706 E. 163rd St., Cleveland 10, O.	4
B33 Bolce Crane Co. Toledo, O.	1,9,11
B34 Boyar-Schultz Corp. 2110 Walnut St., Chicago 12, Ill.	4
B35 Boye & Emmes Machine Tool Co. 81 Caldwell Dr., Hartwell, Cincinnati, O.	6
B36 Bradford Machine Tool Co. 657 Evans St., Cincinnati 4, O.	1,4,5,6
B39 Brickner-Kropf Machine Co. 1217 Riordan St., Muskegon Heights, Mich.	12
B41 Bridgeport Machines Inc. 500 Lindley St., Bridgeport, Conn.	7
B43 Brown-Brockmeyer Co. Dayton, O.	4,5
B44 Brown & Sharpe Mfg. Co. 235 Promenade St., Providence 1, R. I.	4,5,6,7,9
B45 Bryant Chucking Grinder Co. 237 Clinton St., Springfield, Vt.	1,4
B46 Buehler Ltd. 165 W. Wacker Dr., Chicago 1, Ill.	4,5,9
B47 Buffalo Forge Co. P.O. Box 385, Buffalo 5, N. Y.	1,11
B48 Buhr Machine Tool Co. 839 Green St., Ann Arbor, Mich.	1,12
B50 J. W. Bullard & Sons Inc. Fairfield, Conn.	6
B51 Bullard Co. 286 Canfield Ave., Bridgeport 2, Conn.	1,6
B53 Burg Tool Mfg. Co. 3743 Durango Ave., Los Angeles 34, Calif.	1
B54 Burke Machine Tool Co. Div. of U. S. Burke Machine Tool Co. Cincinnati, O.	7
C1 Carlton Machine Tool Co. Spring Grove Ave. & Meeker St., Cincinnati 25, O.	1
C5 Champion Blower & Forge Co. Lancaster, Pa.	1,4,9
C6 Chattanooga Machinery Co. 1006-1016 Watkins St., Chattanooga, 4, Tenn.	12
C7 Chicago Pneumatic Tool Co. 6 E. 44th St., New York 17, N. Y.	1
C8 Cincinnati Bickford Tool Co. 3220 Forrer Ave., Cincinnati 9, O.	1
C9 Cincinnati Electrical Tool Co. Madison & Edwards Rds., Cincinnati 8, O.	4,5,9
C10 Cincinnati Gilbert Machine Tool Co. 3366 Beekman St., Cincinnati 23, O.	1
C11 Cincinnati Lathe & Tool Co. Oakley, Cincinnati 9, O.	1,6
C12 Cincinnati Milling Machine Co. Marburg Ave., Cincinnati 9, O.	2,4,7
C14 Cincinnati Shaper Co. Hopple, Gerrard & Elam Sts., Cincinnati 25, O.	10
C15 Clair Mfg. Co. Inc. 1002 S. Union St., Olean, N. Y.	5
C17 Clearing Machine Corp. 909 Laurel Ave., Hamilton, O.	8
C18 Cleereman Machine Tool Co. 610 W. Washington Blvd., Chicago 6, Ill.	1,11
C20 Cleveland Automatic Machine Co. 1902 Beech St., Cincinnati 12, O.	6,11
C22 Cleveland Grinding Machine Co. 1643 Eddy Rd., Cleveland, O.	4
C23 Cleveland Hobbing Machine Co. 1311 Chardon Rd., Cleveland 17, Euclid, O.	3,6
C24 Cleveland Planer Co. 3118 Superior Ave., Cleveland 14, O.	8
C25 Cleveland Punch & Shear Works Co. 3917 St. Clair Ave. N.E., Cleveland 14, O.	1,8
C27 Cleveland Tapping Machine Co. 1201 Camden Ave. S.W., Canton 6, O.	11
C28 Clizbe Brothers Mfg. Co. P.O. Box 31, Plymouth, Ind.	4,5
C30 Cochrane-Bly Co. Div. of Interstate Mfg. Corp. Boston Post Road, Orange, Conn.	4,7,9
C32 Colonial Broach Co. 925 Book Bldg., Detroit 26, Mich.	2,4
C34 Cone Automatic Machine Co. Inc. Everett Lane, Windsor, Vt.	6
C35 Connecticut Tool & Engineering Co. 541 Iranistan Ave., Bridgeport 5, Conn.	9
C36 Consolidated Machine Tool Corp. Div. of Farrel-Birmingham Co. 565 Blossom Rd., Rochester 10, N. Y.	1,4,6,7,8,9,10,12

Code	Section
C37 Continental Machine Co. 1952 Maud Ave., Chicago 14, Ill.	4,9
C41 James Coulter Machine Co. 629 Railroad Ave., Bridgeport 5, Conn.	6,7
C42 Coulter & McKenzie Machine Co. 771 Water St., Bridgeport 3, Conn.	4
C43 Covel Mfg. Co. Benton Harbor, Mich.	4,9
C44 Cox & Sons Co. Bridgeton, N. J.	9,11
C45 Crane Packing Co. 1800 Cuyler Ave., Chicago 13, Ill.	4
C46 Crankshaft Machine Co. 314 N. Jackson St., Jackson, Mich.	6
C48 J. B. Crosman & Son Inc. 692 Washington St., E. Walpole, Mass.	4
C49 Cross Co. 3250 Bellevue Ave., Detroit 7, Mich.	3,12
C50 Crowningshield-Harris Co. Greenfield, Mass.	7,9
C51 Crozier Machine Tool Co. 684 N. Prairie Ave., Hawthorne, Calif.	5
C52 Crystal Lake Grinders 19 Gate St., Crystal Lake, Ill.	4
C53 Curtis Machine Corp. 1300 E. Second St., Jamestown, N. Y.	5
C54 Clausing Div. Atlas Press Co. Kalamazoo, Mich.	1,6
C55 Cedar-West Machine Co. 90 West St., New York, N. Y.	9,10
C56 Continental Foundry & Machine Co. Pittsburgh, Pa.	6

Code	Section
D2 Dalzen Tool & Mfg. Co. 5255 S. Riverside St., St. Clair, Mich.	1,4
D4 Davis Keyseater Co. 309 Exchange St., Rochester 5, N. Y.	12
D5 Davis & Thompson Co. 4160 N. 124th St., Milwaukee, Wis.	1,7,11,12
D6 Delta Tool Div. Rockwell Mfg. Co. 100 N. Lexington Ave., Pittsburgh, Pa.	1,4,5,9,10,12
D7 F. W. Derbyshire Inc. 157 High St., Waltham 54, Mass.	6,7
D8 A. P. Desanno & Son Inc. Phoenixville, Pa.	9
D10 Detroit Crane & Tool Co. 19651 W. 9 Mile Rd., Ferndale 20, Mich.	6
D11 DeVlieg Machine Co. 430 Fair Ave., Ferndale, Detroit, Mich.	1
D12 Dewalt Inc. Subsidiary of American Machine & Foundry 500 Fountain Ave., Lancaster, Pa.	9
D13 Diamond Machine Tool Co. 2511 Coffman-Pico Rd., Pico, Calif.	7
D16 Dixine Brothers Co. 200 Seward Ave., Utica 1, N. Y.	5
D17 DoAll Co. 254 North Laurel Ave., Des Plaines, Ill.	4,9
D20 Duro Metal Products Co. 2649-61 N. Kildare Ave., Chicago, Ill.	4,9
D21 Dyknex Corp. 17-19 Grove St., Montclair, N. J.	4,5,12

Code	Section
E1 Eastern Machine Screw Corp. Truman & Barclay Sts., New Haven, Conn.	1,11
E2 Economy Engineering Co. 108 Vine St., Willoughby, O.	11,12
E4 Eisler Engineering Co. Inc. 750 S. 13th St., Newark 3, N. J.	9
E5 Ekstrom, Carlson & Co. 1429 Railroad Ave., Rockford, Ill.	1,7
E7 Electro-Arc Mfg. Co. Box 448, Ann Arbor, Mich.	12
E8 Electro-Mechano Co. 261 E. Erie St., Milwaukee 2, Wis.	1
E9 Elgin Tool Works Inc. 1770 Berteau Ave. at Ravenswood Ave., Chicago 13, Ill.	6,7
E10 Ellward Mfg. Corp. 333-335 Nassau Ave., Brooklyn 22, N. Y.	5
E11 Elcox Corp. 720 Rochester Rd., Clawson, Mich.	12
E14 Engineering & Research Corp. P. O. Box 209, Hyattsville, Md.	7
E15 Enterprise Co. Columbiana, O.	1,4,6
E16 Enterprise Machine Parts Corp. 2731 Jerome Ave., Detroit 12, Mich.	12
E17 Espen-Lucas Machine Works Front St. & Girard Ave., Philadelphia, Pa.	1,4,8,9,12
E18 Etco Tool Co. Inc. 594 Johnson Ave., Brooklyn 37, N. Y.	11
E19 Ex-Cell-O Corp. 1200 Oakman Blvd., Detroit 32, Mich.	1,4,5,7
E20 Excelsior Tool & Machine Co. 3100 Ridge Ave., East St. Louis, Ill.	5

Code	Section
F1 Famco Machine Co. 3100 Sheridan Rd., Kenosha, Wis.	1,9
F3 Farrel-Birmingham Co. Inc. 25 Main St., Ansonia, Conn.	3,4
F5 Fellows Gear Shaper Co. 78 River St., Springfield, Vt.	3,4
F6 Fischer Machine Co. 310 N. 11th St., Philadelphia 7, Pa.	1
F7 Fitchburg Engineering Corp. Fitchburg, Mass.	1,7,12
F9 Foote-Burt Co. 13000 St. Clair Ave., Cleveland 8, O.	1,2,4,12
F10 Forbes & Myers 175 Union St., Worcester 8, Mass.	4
F11 Wm. A. Force & Co. Inc. 216 Nichols Ave., Brooklyn 8, N. Y.	12
F12 Forney's Inc. 209 Elm St., New Castle, Pa.	1,7
F13 Fosdick Machine Tool Co. Blue Rock & Apple Sts., Cincinnati 23, O.	1
F14 Fox Engineering Co. 1326 Francis St., Jackson, Mich.	1,2,11
F15 Fox Grinders Inc. 1518 Oliver Bldg., Pittsburgh, Pa.	4,9
F17 Fraudenthal Div. of Kaydon Engineering Corp. 930 W. Sherman Blvd., Muskegon, Mich.	1,4
F18 Fray Machine Tool Co. 515 W. Windsor Rd., Glendale 1, Calif.	7
F19 Frew Machine Co. Colladay Machine Works 123 E. Luray St., Philadelphia 20, Pa.	1,7,11,12
F20 C. Allen Fulmer Co. 1211 First National Bank Bldg., Cincinnati, O.	1

Code	Section
G1 Gallmeyer & Livingston Co. Grand Rapids 4, Mich.	4
G2 Gardner Machine Co. Beloit, Wis.	4
G4 Gear Grinding Machine Co. 3901 Christopher St., Detroit 11, Mich.	3
G6 Gemco Shaper Co. 1417 Ocatilla Ave., St. Louis 16, Mo.	10
G8 Giddings & Lewis Machine Tool Co. Fon du Lac, Wis.	1,7,8
G9 Gilman Engineering & Mfg. Corp. 305 W. Eastern Ave., Janesville, Wis.	12
G10 Gisholt Machine Co. 1245 E. Washington Ave., Madison 10, Wis.	1,6
G12 Gleason Works 1000 University Ave., Rochester 3, N. Y.	3,4
G14 George Gorton Machine Co. Racine, Wis.	1,6,7
G15 Goss & De Leeuw Machine Co. Kensington, Conn.	6
G16 Gould & Eberhardt Inc. 133 Fabyan Pl., Irvington 11, N. J.	3,10
G18 Grant Mfg. & Machine Co. 90 Sillman Ave., Bridgeport 5, Conn.	11,12
G20 G. A. Gray Co. 3611 Woodburn Ave., Evanston, Cincinnati 7, Ohio	1,7,8
G21 Greenes Machine Tool Co. Div. J. A. Fay & Egan Co. 2011 Eastern Ave., Cincinnati, O.	7,12
G22 Greenlee Brothers & Co. 2136 12th St., Rockford, Ill.	6,12
G24 Grinders & Fixtures Inc. 8372 Clinton Rd., Cleveland 9, O.	4
G25 The Grinding & Polishing Machinery Corp. 2530 Winthrop Ave., Indianapolis 25, Ind.	4,5

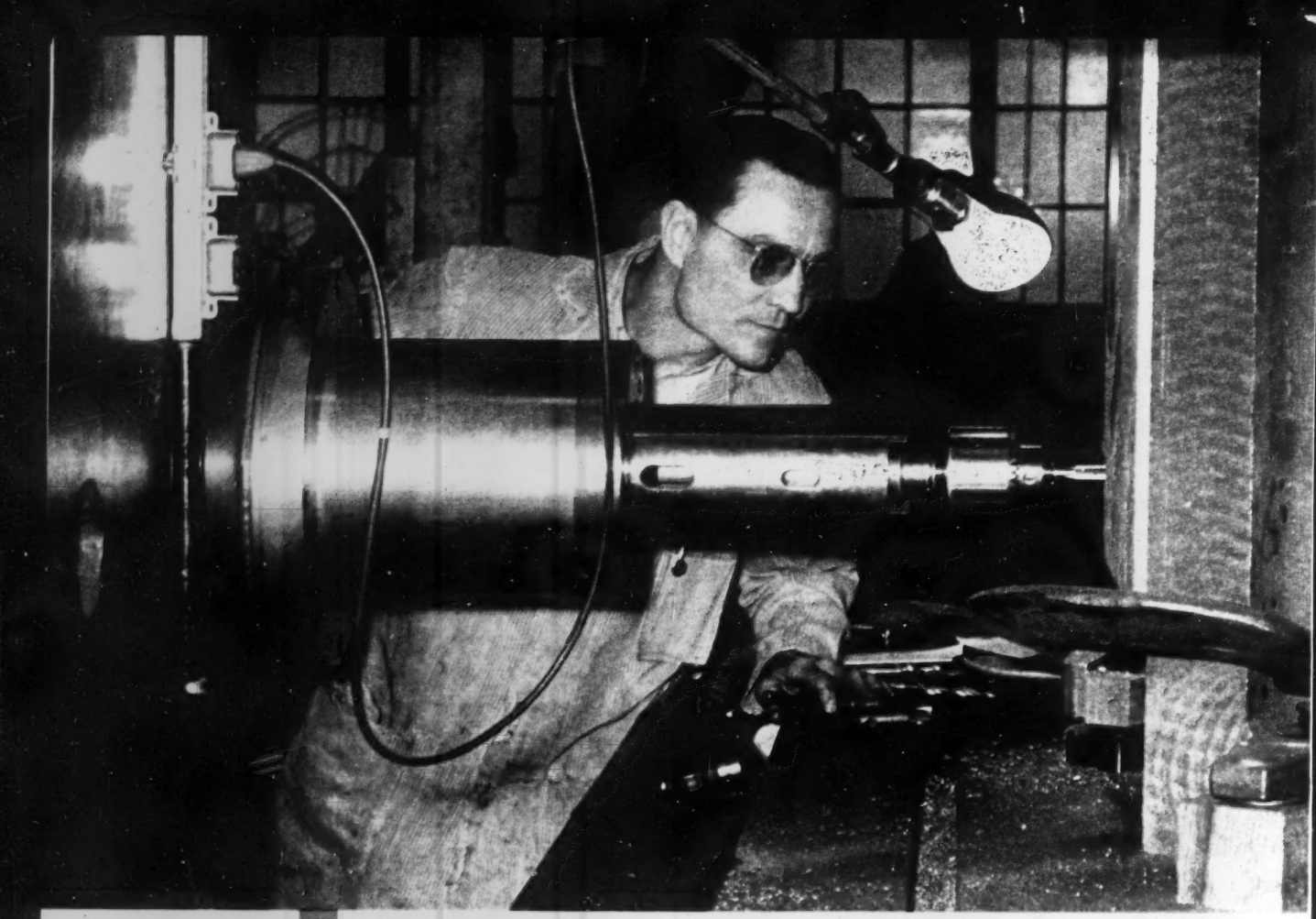
Code	Section
H1 Hack Machinery Co. 1228 Harding, Des Plaines, Ill.	7
H3 Hall Planetary Co. Fox St. & Abbotsford Ave., Philadelphia 29, Pa.	7
H4 Hamilton Tool Co. Hamilton, O.	1,3,11
H5 Hammond Machinery Builders Inc. 1600 Douglas Ave., Kalamazoo 54, Mich.	4,5
H6 Hanchett Mfg. Co. Big Rapids, Mich.	4,9
H8 Hanson-Whitney Machine Co. Div. of The Whitney Chain Co. 169 Bartholomew Ave., Hartford 2, Conn.	4,7,12
H9 Hardinge Brothers Inc. 1420 College Ave., Elmira, N. Y.	6,7
H10 Hartford Special Machinery Co. 287 Homestead Ave., Hartford 12, Conn.	1,5,11
H11 Harvey Mfg. Corp. 161 Grand St., New York 13, N. Y.	4,9
H12 Havir Mfg. Co. 2363 University Ave., St. Paul, Minn.	10
H13 Heald Machine Co. 10 New Bond St., Worcester 6, Mass.	1,4
H14 Heald Machine Works 1835 Stewart St., Springfield, Mo.	7
H15 Hendey Machine Co. Torrington, Conn.	6,10
H17 Hess Machine Works 1661 Lancaster Ave., Philadelphia 31, Pa.	10
H18 Heston & Anderson Fairfield, Iowa	9
H19 High Speed Hammer Co. Inc. 313 Norton St., Rochester 21, N. Y.	1
H20 Hill Acme Co. 1201 W. 65th St., Cleveland 2, O.	4,5
H21 Hilyard Co. 128 Washington St., Norristown, Pa.	9
H22 Hisey-Wolf Machine Co. Div. of Cincinnati Electrical Tool Co. Cincinnati 8, O.	4,5
H23 Hjorth Lathe & Tool Co. 8-12 Beacon St., Woburn, Mass.	6
H24 Hoern & Tolts Inc. 925 Bird Ave., Saginaw, Mich.	12
H25 Hole Engineering Service 21100 Collingham Box 1877, Detroit 19, Mich.	1,11
H28 Hunter Saw & Machine Co. 57th & Butler Sts., Pittsburgh 1, Pa.	9
H29 Hydro-Buer Co. 1601 E. Olympic Blvd., Los Angeles 21, Calif.	1
H30 Hyde Park Foundry & Machine Co. Hyde Park, Pa.	6

Code	Section
I1 Ideal Tool & Die Co. Inc. 233-35 Congress St., Schenectady 3, N. Y.	9
I2 Illinois Tool Works 2501 N. Keeler Ave., Chicago 39, Ill.	9
I3 Index Machine & Tool Co. 343 N. Mechanic St., Jackson, Mich.	7
I4 Ingersoll Milling Machine Co. Rockford, Ill.	1,4,7,12
I5 Inter Lakes Engineering Corp. 815 Bellevue, Detroit, Mich.	1,12

Code	Section
J1 Jackson Hydraulic Machine Co. Inc. 1401 N. Main St., Rockford, Ill.	10
J2 Jackson Machine & Tool Co. 925 Roberts St., Jackson, Mich.	7
J3 Jefferson Machine Tool Co. 660-670 W. 4th St., Cincinnati 3, O.	5
J4 Johnson Mfg. Corp. Albion, Mich.	9

Code	Section
J5 Jones & Lamson Machine Co. 160 Clinton St., Springfield, Vt.	4,6,12
K1 Kalamazoo Tank & Silo Co. 508-608 Harrison St., Kalamazoo, Mich.	9
K2 Kaufman Mfg. Co. 29th & Meadow Lane, Manitowoc, Wis.	11
K3 Kaukauna Machine Corp. 109 Lincoln Ave., Kaukauna, Wis.	1
K4 Kearney & Trecker Corp. 6784 W. National Ave., Milwaukee 14, Wis.	1,4,7
K5 Keller Tool & Machine Works 601-609 Jefferson St., Eau Claire, Wis.	9
K6 Kempsmith Machine Co. 1849 S. 71st St., Milwaukee 14, Wis.	1,7
K8 Kent Machine Co. Portage Rd., Cuyahoga Falls, O.	1,11,12
K9 Kent-Owens Machine Co. 908 Wall St., Toledo, O.	7
K10 King Machine Tool Div. American Steel Foundries 1150 Tennessee Ave., Cincinnati 29, O.	1
K11 Kingsbury Machine Tool Corp. Keene, N. H.	1
K12 King Brothers Engineering Works 1320 N. Kostner Ave., Chicago 51, Ill.	4,7,9
K13 W. B. Knight Machinery Co. 3920 W. Pine Blvd., St. Louis 8, Mo.	1,7
K14 Krueger Barnes Corp. 1169 E. Grand Blvd., Detroit 11, Mich.	1
L1 L-W Chuck Co. 24 S. St. Clair St., Toledo, O.	9
L2 Wilson Laidlaw Inc. 101 Winter St., Belmont, N. Y.	9
L3 Lambert Inc. Ansonia, O.	4
L4 Landis Machine Co. Church & Fifth Sts., Waynesboro, Pa.	4,9,11,12
L5 Landis Tool Co. Sixth & Ringgold Sts., Waynesboro, Pa.	4
L7 Lapointe Machine Tool Co. 34 Tower St., Hudson, Mass.	2,4
L9 H. Leach Machinery Co. 367 Charles St., Providence 4, R. I.	4
L10 R. K. Leblond Machine Tool Co. Madison & Edwards Rds., Cincinnati 8, O.	4,6,12
L11 K. O. Lee Co. Aberdeen, S. Dak.	4
L12 Lee Engineering Co. Inc. 4700 Burlingame Ave., Detroit 4, Mich.	12
L13 Lees-Bradner Co. 12120 Elmwood Ave., Cleveland, O.	1,7,11
L14 Leffler Machinery & Die Co. Inc. 75 Clymer St., Brooklyn 11, N. Y.	11,12
L15 Lehmann Machine Co. 3366 Choteau Ave., St. Louis 3, Mo.	6
L16 Leland Gifford Co. 1001 Southbridge St., Worcester, Mass.	1
L17 Le Maire Tool & Mfg. Co. 2657 S. Telegraph Rd., Dearborn, Mich.	1,7,12
L18 Lempco Products Inc. 5499 Dunham Rd., Bedford, O.	4
L19 Louis Levin & Son Inc. 752 E. Pico Blvd., Los Angeles 21, Calif.	1,6
L20 Charles F. L'Hommedieu & Sons Co. 4521 Ogden Ave., Chicago, Ill.	5
L21 Lima Electric Motor Co. Box 918, Lima, O.	4,5
L22 Lindley Bros. Co. 682 State St., Bridgeport 1, Conn.	1
L23 Lipe-Rollway Corp. 710-840 Emerson Ave., Syracuse, 1, N. Y.	6
L24 Lippman Engineering Works 4603 W. Mitchell St., Milwaukee, Wis.	4,5
L25 Lobdell United Co. Wilmington, Del.	4,10
L26 Lodge & Shipley Co. 3663 Colerain Ave., Cincinnati 25, O.	6
L27 Logan Engineering Co. 4901 W. Lawrence Ave., Chicago, Ill.	6,10
L29 Lucas Machine Div. New Britain Machine Co. 12502 Kirby Ave., Cleveland 5, O.	1
M1 McKintosh-Hemphill Co. 901 Bingham St., Pittsburgh 3, Pa.	6
M2 Magna Engineering Corp. 110 Linfield Drive, Menlo Park, Calif.	1,11
M3 Maquoketa Co. P.O. Box 190, Clinton, Iowa	9
M5 C & E Marshall Co. 1115 W. Jackson Blvd., Chicago, Ill.	6
M6 Martin Machine Co. Montague, Mass.	12
M8 Mattison Machine Works Blackhawk Park Ave., Rockford, Ill.	4
M9 Max Mfg. Co. Elk Stockton Ave., San José 26, Calif.	4
M10 Maynard Machine Shop Inc. 46 Spring St., Nashua, N. H.	3
M11 McDonough Mfg. Co. Eau Claire, Wis.	4
M12 McIlvaine Machine Works 12 S. 6th Ave., Yakima, Wash.	6,12
M13 McPherson Broach & Machine Co. 6210 Second Ave., Detroit, Mich.	2
M14 Mead Specialties Co. 1314-24 N. Knox Ave., Chicago 51, Ill.	5
M16 Mercury Engineering Corp. 2100 N. Farwell Ave., Milwaukee 2, Wis.	4
M18 Mesta Machine Co. P.O. Box 1466, Pittsburgh, Pa.	1,4,6,8,10
M19 Metalmaster Div. Clinton Machine Co. Clinton, Mich.	12
M20 Michigan Drill Head Co. 971 E. 8 Mile Rd., Hazel Park, Mich.	1
M21 Michigan Tool Co. 7171 E. McNichols Rd., Detroit 12, Mich.	3
M22 Micromatic Hone Corp. 8100 Schoolcraft Ave., Detroit 4, Mich.	4
M23 Midway Machine Co. 2324 University Ave., St. Paul 14, Minn.	7
M24 Miller Glass Engineering Co. 141 South Glenwood Ave., Columbus 8, O.	12
M25 Miller-Knuth Mfg. Co. Auburn, Nebr.	9
M26 W. K. McDonald Machinery Co. 6402 Westfield Blvd., Indianapolis 20, Ind.	12
M27 Minit-Cutter Grinder Co. 19 Stewart St., Lynn, Mass.	4
M28 Mills & Merrill 1000 S. Water St., Saginaw, Mich.	12
M29 Modern Industrial Engineering Co. 14320 Birwood, Detroit, Mich.	3
M30 Modern Machine Tool Co. 2000 Losey Ave., Jackson, Mich.	9
M31 Moline Tool Co. 102 20th St., Moline, Ill.	1,4,12
M32 Monarch Machine Tool Co. Sidney, O.	6
M33 Moore Special Tool Co. Inc. 700 Union Ave., Bridgeport 7, Conn.	1,4
M34 Morey Machinery Co. Inc. 410 Broome St., New York 13, N. Y.	6,7,10
M35 Morris Machine Tool Co. Court & Harriet Sts., Cincinnati 3, O.	1,12
M36 Morton Mfg. Co. Broadway & Hoyt, Muskegon Hts., Mich.	1,7,10
M37 Motch & Merryweather Machinery Co. 715 Penton Bldg., Cleveland 13, O.	4,6,7,9,12
M38 Mummert-Dixon Co. Philadelphia St., Hanover, Pa.	4
M39 Mutchey Div. of Sheffield Corp. 721 Springfield St., Dayton, O.	7,9,11,12
M40 Murray-Way Corp. 3925 W. Fort St., Detroit 16, Mich.	5
N1 National Acme Co. 170 E. 131st St., Cleveland 8, O.	4,6,11
N2 National Automatic Tool Co., Inc. South 7 & N. Sts., Richmond, Ind.	1,11,12
N3 National Broach & Machine Co. 5600 St. Jean Ave., Detroit 13, Mich.	3
N4 National Jet Co. 117 Milton Pl., Cumberland, Md.	1
N5 National Machinery Co. Tiffin, O.	11,12
N6 Nebel Machine Tool Co. 3100 Central Parkway, Cincinnati 25, O.	6
N7 New Britain-Gridley Machine Div. New Britain Machine Co., New Britain, Conn.	1,6
N9 New Hermes Inc. 13-19 University Place, New York 3, N. Y.	4,7
N10 Newark Gear Inc. 69 Prospect St., Newark 5, N. J.	3
N11 W. H. Nichols Co. Waltham, Mass.	7
N12 Nife Inc. Lambert Ave., Copiague, L. I., N. Y.	4
N13 Noble & Westbrook Mfg. Co. East Hartford 8, Conn.	12
N14 Norton Co. Worcester 6, Mass.	4
N15 Numberall Stamp & Tool Co. 379 Huguenot Ave., Staten Island 12, N. Y.	12
N16 Nicholas Equipment Co. Railroad & Lincoln St., Bellevue, O.	4,5
O1 Ohio Machine Tool Co. South Leighton St. & Erie Railway Kenton, O.	
O2 Oliver Instrument Co. Adrian, Mich.	4,9
O4 Onsrud Machine Works Inc. 3900 Palmer St., Chicago 47, Ill.	1,7
O5 Oster Mfg. Co. 2057 E. 61st Pl., Cleveland 3, O.	6,9,11
O6 Osborn Mfg. Co. 5101 Hamilton Ave., Cleveland, O.	1,12
P1 Packer Machine Co. Meriden, Conn.	5
P2 Parker-Majestic Inc. 147 Jos. Campau Ave., Detroit 7, Mich.	4
P3 Pawtucket Mfg. Co. Pawtucket, R. I.	12
P4 Peerless Machine Co. Racine, Wis.	4,9,11
P5 Pellow Machine Co. 13500 Foley Ave., Detroit 27, Mich.	12
P6 Peterson Welding Laboratories 1423 Virginia St., Kansas City 6, Mo.	4
P7 Peerless Production Co. 19449 Glendale, Detroit 23, Mich.	1,12
P8 Pines Engineering Co. Inc. 601 Walnut St., Aurora, Ill.	11,12
P9 Pipe Machinery Co. 29100 Lakeland Blvd., Wickliffe, O.	11,12
P10 Plan-O-Mill Corp. 1411 East Eight Mile Rd., Hazel Park, Mich.	7
P11 Portage Machine Co. 1027 Sweitzer Ave., Akron 11, O.	1
P12 Porter-Cable Machine Co. 1714 North Salina St., Syracuse 8, N. Y.	5
P13 Porter-McLeod Machine Tool Co. Inc. Hatfield, Mass.	4,5,6,9
P14 Potter & Johnson Co. Subsidiary of Pratt & Whitney Div. Niles-Bement-Pond Co. Pawtucket, R. I.	6
P15 Potter Tool & Machine Works Inc. 79 E. 130th St., New York, N. Y.	6
P16 Pottstown Machine Co. Rohland St., Pottstown, Pa.	6,11,12
P17 Pratt & Whitney Div. Niles-Bement-Pond Co. W. Hartford 1, Conn.	1,3,4,6,7,10,12
P18 H. P. Preis Engraving Machine Co. 651 U. S. Highway #22, Hillside 5, N. J.	4,7

Code	Section
P20 Procunier Safety Chuck Co. 18 S. Clinton St., Chicago 6, Ill.	11
P21 Production Machine Co. Greenfield, Mass.	4,5
P22 Production Machinery Development Co. Inc. 4849 St. Aubin Ave., Detroit 7, Mich.	6,7
P23 Producto Machine Co. 990 Housatonic Ave., Bridgeport 1, Conn.	7,9
P24 Thomas Prosser & Son 120 Wall St., New York, N. Y.	4
P25 Providence Engineering Works Corp. Providence, R. I.	1
P26 D. H. Prutton Machinery Co. 5295 W. 130th St., Cleveland 11, O.	11
P27 Portland Machine Tool Works South Portland, Me.	7
Q1 Queen City Machine Tool Co. 3900 Kellogg Ave., Cincinnati 26, O.	4,5
R1 Racine Hydraulics & Machinery Inc. 2000 Albert St., Racine, Wis.	9
R2 Reading Machine Co. Cincinnati 37, O.	12
R3 Reed-Prentice Corp. 677 Cambridge St., Worcester 4, Mass.	6,7
R4 Reed Rolled Thread Die Co. P.O. Box 350, Worcester 1, Mass.	11
R5 Rehnberg-Jacobson Mfg. Co. 2135 Kishwaukee St., Rockford, Ill.	1,9,11,12
R6 Reid Brothers Co. Inc. 138 Elliott St., Beverly, Mass.	4,6
R8 Rice Pump & Machine Co. 1032 N. 10th Ave., Grafton, Wis.	4,9
R9 J. A. Richards Co. Kalamazoo, Mich.	7,9
R10 Rickert-Shafer Co. 613 W. 11th St., Erie 6, Pa.	11
R11 Rivett Lathe & Grinder Inc. 18 Riverview Rd., Brighton 35, Boston, Mass.	4,6
R12 L. Robaczynski Machine Co. 326-340 Ten Eyck St., Brooklyn 6, N. Y.	4
R13 Wm. Robertson Machine & Foundry Co. Inc. 56-58 Rano St., Buffalo 7, N. Y.	9
R14 Rockford Machine Tool Co. 2300 Kishwaukee St., Rockford, Ill.	6,8,10
R16 Rogers Machine Works Inc. 61 N. Main St., Alfred, N. Y.	1
R17 Roll-In Saw Co. Parma, Mich.	9
R18 H. B. Rouse & Co. 2214 N. Wayne Ave., Chicago 14, Ill.	7
R19 The Rowbottom Machine Co. Inc. Sheffield St., Waterbury 14, Conn.	4,7
R20 Royal Oak Tool & Machine Co. 613-621 E. 4th St., Royal Oak, Mich.	4
R21 Royersford Foundry & Machine Co. Inc. 102-132 Main St., Royersford, Pa.	4,5,9
R22 Ryman Engineering Co. 523 Spring Ave., Elwood City, Pa.	4
S1 Sanford Mfg. Co. 1029-2s Commerce Ave., Union, N. J.	4
S2 Saunders Mfg. Co. 21 Atherton St., Yonkers 1, N. Y.	11
S3 Savage Mfg. Co. 415 S. 7th St., Phoenix, Ariz.	1
S4 Scandia Mfg. Co. 500 Belleville Turnpike, North Arlington, N. J.	5
S5 Schauer Mfg. Corp. 4509 Alpine Ave., Cincinnati 36, O.	5
S6 George T. Schmidt Inc. 4100 Ravenswood Ave., Chicago 13, Ill.	12
S8 Seneca Falls Machine Co. 314-340 Fall St., Seneca Falls, N. Y.	6,12
S9 Sheffield Corp. 721 Springfield St., Dayton 1, O.	3,4
S10 Sheldon Machine Co. 4258 N. Knox Ave., Chicago 41, Ill.	6,7,10
S11 Shields Mfg. Co. Inc. 38-09—24th St., Long Island City, N. Y.	7
S12 Sibley Machine & Foundry Corp. 206 E. Tutt St., South Bend, Ind.	1
S13 Sidney Machine Tool Co. Sidney, O.	6
S14 Sigourney Tool Co. Hartford 6, Conn.	1
S15 Simmons Machine Tool Corp. 1700 Broadway, Albany, 1 N. Y.	6
S17 Simplex Machine Tool Corp. Milwaukee, Wis.	1,7
S18 Size Control Co. 2500 W. Washington Blvd., Chicago 12, Ill.	4
S20 Sloan & Chace Mfg. Co. Inc. 344 Hickory St., Kearny, N. J.	1,6,7,11
S21 Smith & Mills Co. 640 W. Washington Blvd., Chicago 6, Ill.	10
S22 Snow Mfg. Co. 435 Eastern Ave., Bellwood, Ill.	1,11
S23 Snyder Tool & Engineering Co. 3400 E. Lafayette Ave., Detroit 7, Mich.	1,7,12
S24 Sommerfeld Machine Co. 201-03 Corey Ave., Braddock, Pa.	6
S25 South Bend Lathe Works 425 E. Madison St., South Bend 22, Ind.	1,4,6,10
S27 Sparks Machine Tool Corp. South Norwalk, Conn.	6
S28 Springfield Machine Tool Co. 610 W. Washington Blvd., Chicago 6, Ill.	4,6
S29 William K. Stamets Co. 1026 Jenkins Arcade Bldg., Pittsburgh, Pa.	1,6,9,11
S30 Standard Electrical Tool Co. 2100 River Rd., Cincinnati, O.	4,5
S31 Standard Engineering Works P.O. Box 433, Pawtucket, R. I.	7
S33 Staple Engineering Co. 1315 South Woodward Ave., Birmingham, Mich.	4
S36 Stark Tool Co. Waltham, Mass.	6,7
S38 John B. Stevens Co. Somersville, Conn.	6,12
S39 Stone Machinery Co. Inc. 100 Fayette St., Manlius, N. Y.	9
S40 Storm-Vulcan Inc. 2225 Burbank St., Dallas 19, Tex.	4
S41 Sunnen Products Co. 7929 Manchester Ave., St. Louis 17, Mo.	4
S42 Sunray Co. P.O. Box 445, Spartanburg, S. C.	12
S43 Sundstrand Machine Tool Co. Rockford, Ill.	6,7,12
S44 Superior Hone Corp. 1605 Elreno St., Elkhart, Ind.	4
S45 Superior Machine & Engineering Co. 1930 Ferry Park, Detroit, Mich.	12
S46 Steele Machine Co. New Britain, Conn.	11
T1 Tabor Mfg. Co. 6225 Tacony St., Philadelphia 35, Pa.	9
T2 Taft-Pierce Mfg. Co. Woonsocket, R. I.	1,4
T3 Tannewitz Works 301-325 Front Ave. N.W., Grand Rapids 2, Mich.	
T4 Taylor Dynamometer & Machine Co. 528 W. Highland Ave., Milwaukee 3, Wis.	1
T5 Taylor-Wilson Mfg. Co. 1611 Keenan Bldg., Pittsburgh 22, Pa.	1,9,11,12
T6 Thomas Machine Mfg. Co. Erie Branch P.O., Pittsburgh 25, Pa.	8,12
T7 Thompson Grinder Co. Springfield, O.	4
T8 Thor Power Tool Co. 175 N. State St., Aurora, Ill.	4
T9 Thornton Mechanical Laboratory Inc. 1711 N. Kimball Ave., Chicago 47, Ill.	4
T10 Thurston Mfg. Co. 15 Borden St., Providence 1, R. I.	7
T12 Toledo Pipe Threading Machine Co. 1425-1445 Summit St., Toledo 4, O.	11
T13 Torrington Mfg. Co. 70 Franklin St., Torrington, Conn.	7,9
T14 H. P. Townsend Mfg. Co. Brook St., Elmwood 10, Conn.	1,6,7,11,12
T15 Tree Tool & Die Works 1600 Junction Ave., Racine, Wis.	7
T16 Turner Bros. Inc. 2625 Hilton Rd., Ferndale 20, Mich.	12
T17 Tyler Mfg. Co. 6149 W. 95th St., Los Angeles 45, Calif.	9
T18 Turchan Follower Machine Co. 8259 Livernois, Detroit, Mich.	1,7
U2 United Engineering & Foundry Co. 948 Duquesne Way, Pittsburgh 22, Pa.	6
U4 United States Electrical Tool Co. 1050 Findlay St., Cincinnati 14, O.	4,5,12
U6 U. S. Tool Co. Inc. 255 N. Eighteenth St., Ampere, N. J.	7
V2 Van Norman Co. 3640 Main St., Springfield 7, Mass.	3,4,7
W1 Wade Tool Co. 19 River St., Waltham 54, Mass.	6,7
W2 Wadell Equipment Co. 19 South Ave., Garwood, N. J.	1,4,6,12
W4 Wales-Strippit Corp. 345 Payne Ave., North Tonawanda, N. Y.	1
W5 O. S. Walker Co. Inc. Worcester 6, Mass.	4
W6 Walker-Turner Div. of Kearney & Trecker Corp. Plainfield, N. J.	1,4,5,9
W7 Waltham Machine Works 296 Newton St., Waltham, Mass.	3,7
W9 Warner & Swasey Co. 5701 Carnegie Ave., Cleveland 3, O.	6,11
W10 Waterbury Farrel Foundry & Machine Co. Box 70, Waterbury 20, Conn.	6,9,11,12
W11 Waterbury Tool Div. Vickers Inc. 172 E. Aurora St., Waterbury 91, Conn.	4
W12 Watson-Flagg Machine Co. Inc. 81s E. 24th St., Paterson 3, N. J.	11
W14 Wells Mfg. Corp. Box 411, Three Rivers, Mich.	9
W15 W. F. Wells & Sons North on U.S. 131, Three Rivers, Mich.	9
W16 Western Machine Tool Works Holland, Mich.	1,6,10,11
W18 Wicaco Machine Co. Stenton Ave. & Louden St., Philadelphia 41, Pa.	1
W19 Wickes Bros. Div. of Wickes Corp. 515 N. Washington Ave., Saginaw, Mich.	6,7
W20 S. A. Woods Machine Co. 27 Iranrell St., Boston, Mass.	4
W21 Worcester Polytechnic Institute Washburn Shops 14 Boynton St., Worcester 2, Mass.	4
W22 Henry H. Wise Co. 914 Wilshire Blvd., Los Angeles 17, Calif.	9
Y1 Yates American Machine Co. 729 Fourth St., Beloit, Wis.	4,9
Y2 Youngstown Foundry & Machine Co. Federal & Reserve Sts., Youngstown 1, O.	6
Z1 Zagar Tool Inc. 21000 Lakeland Blvd., Cleveland 23, O.	1,2



MANUFACTURERS IN THIS SECTION

Charles G. Allen Co.—A12
The American Tool Works Co.—A17
Atlas Press Co.—A21
Avey Drilling Machine Co.—A25
Baker Brothers Inc.—B2
Baldwin-Lima-Hamilton Corp.—B4
Barnes Drill Co.—B8
W. F. & John Barnes Co.—B9
Barrett Machine Tool Co.—B11
Baush Machine Tool Co.—B12
H. Bickford & Co.—B19
The Bodine Corp.—B31
Boice Crane Co.—B33
The Bradford Machine Tool Co.—B36
Bryant Chucking Grinder Co.—B45
Buffalo Forge Co.—B47
Buhr Machine Tool Co.—B48
Bullard Co.—B51
Burg Tool Mfg. Co.—B53
Carlton Machine Tool Co.—C1
Champion Blower & Forge Co.—C5
Chicago Pneumatic Tool Co.—C7
Cincinnati Bickford Tool Co.—C8
Cincinnati Gilbert Machine Tool Co.—C10
Cincinnati Lathe & Tool Co.—C11
Cleereman Machine Tool Co.—C18
Cleveland Punch & Shear Works Co.—C25
Consolidated Machine Tool Corp.
Div. of Farrel Birmingham Co.—C36
Clausing Div., Atlas Press Co.—C54
Dalzen Tool & Mfg. Co.—D2
Davis & Thompson Co.—D5
Delta Tool Div., Rockwell Mfg. Co.—D6
DeVlieg Machine Co.—D11
Duro Metal Products Co.—D20
Ekstrom, Carlson & Co.—E5
Electro-Mechano Co.—E8
Enterprise Co.—E15
Espen-Lucas Machine Works—E17
Ex-Cell-O Corp.—E19
Famco Machine Co.—F1
Fischer Machine Co.—F6
Fitchburg Engineering Corp.—F7
Foote-Burt Co.—F9
Forney's Inc.—F12
Fosdick Machine Tool Co.—F13
Fox Engineering Co.—F14
Frauentha' Div.—F17
Frew Machine Co.—F19
Giddings & Lewis Machine Tool Co.—G8
G. A. Gray Co.—G20
Hamilton Tool Co.—H4
Hartford Special Machinery Co.—H10
Heald Machine Co.—H13
High Speed Hammer Co. Inc.—H19
Hole Engineering Service—H25
Hydro-Borer Co.—H29
Ingersoll Milling Machine Co.—I4

SECTION 1

Boring and Drilling Machines

Inter Lakes Engineering Corp.—I5
Kaukauna Machine Corp.—K3
Kearney & Trecker Corp.—K4
Kempsmith Machine Co.—K6
Kent Machine Co.—K8
King Machine Tool Div.,
American Steel Foundries—K10
Kingsbury Machine Tool Corp.—K11
W. B. Knight Machinery Co.—K13
Krueger-Barnes Corp.—K14
Leland-Gifford Co.—L16
Le Maire Tool & Mfg. Co.—L17
Louis Levin & Son Inc.—L19
Linley Bros. Co.—L22
Lucas Machine Div.,
New Britain Machine Co.—L29
Magna Engineering Corp.—M2
Mesta Machine Co.—M18
Michigan Drill Head Co.—M20
Moline Tool Co.—M31
Moore Special Tool Co. Inc.—M33
Morris Machine Tool Co.—M35
Morton Mfg. Co.—M36
National Automatic Tool Co. Inc.—N2
National Jet Co.—N4
New Britain-Gridley Machine Div.,
New Britain Machine Co.—N7
Ohio Machine Tool Co.—01
Onsrud Machine Works Inc.—04
Peerless Production Co.—P7
Portage Machine Co.—P11
Pratt & Whitney Div.,
Niles-Bement-Pond Co.—P17
Providence Engineering Works Corp.—P25
Rehnberg-Jacobson Mfg. Co.—R5
Rogers Machine Works Inc.—R16
Royersford Foundry & Machine Co. Inc.—R21
Savage Mfg. Co.—S3
Sibley Machine & Foundry Corp.—S12
Sigourney Tool Co.—S14
Simplex Machine Tool Corp.—S17
Sloan & Chace Mfg. Co. Inc.—S20
Snow Mfg. Co.—S22
Snyder Tool & Engineering Co.—S23
South Bend Lathe Works—S25
William K. Stamets Co.—S29
Taft-Pierce Mfg. Co.—T2
Taylor Dynamometer & Machine Co.—T4
Taylor-Wilson Mfg. Co.—T5
H. P. Townsend Mfg. Co.—T14
Turchan Follower Machine Co.—T18
Wadell Equipment Co.—W2
Wales-Strippit Corp.—W4
Walker-Turner Div.,
Kearney & Trecker Corp.—W6
Western Machine Tool Works—W16
Wicaco Machine Co.—W18
Zagar Tool Inc.—Z1

BORING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Horizontal Boring, Drilling & Milling Machines

Table Type

2½" dia. spindle K6
2⅝" dia. spindle, 60" bed, 24" x 42" table.. G8
2½" dia. spindle, 72" bed, 30" x 48" table.. G8
2½" dia. spindle, 84" bed, 30" x 60" table.. G8
3" dia. spindle, 60" bed B51
3" dia. spindle, 60" bed, 30" x 60" table ... G8
3" dia. spindle, 72" bed B51
3" dia. spindle, 72" bed, 30" x 48" table ... G8
3" spindle, 72" bed L29
3" dia. spindle, 84" bed, 36" x 72" table ... G8
3" dia. spindle, 96" bed B51
3" spindle, 96" bed L29
3" spindle, 120" bed L29
3½" spindle, 38" x 60" table C10
3½" spindle, 38" x 72" table C10
3½" spindle, 48" x 60" table C10
3½" spindle, 48" x 72" table C10
3¾" dia. spindle K6
4" dia. spindle, 72" bed B51
4" dia. spindle, 72" bed, 36" x 72" table ... G8
4" dia. spindle, 84" bed, 36" x 60" table ... P11
4" dia. spindle, 84" bed, 36" x 72" table .. P11
4" dia. spindle, 84" bed, 36" x 96" table .. P11
4" dia. spindle, 84" bed, 48" x 72" table .. P11
4" dia. spindle, 96" bed B51
4" dia. spindle, 96" bed, 48" x 72" table ... G8
4" spindle, 96" bed L29
4" dia. spindle, 120" bed B51
4" dia. spindle, 120" bed, 36" x 96" table ... G8
4" dia. spindle, 120" bed, 48" x 84" table ... G8
4" dia. spindle, 120" bed, 48" x 96" table ... G8
4" dia. spindle, 120" bed, 48" x 120" table .. G8
4" dia. spindle, 120" bed, 48" x 132" table .. G8
4" dia. spindle, 120" bed, 60" x 96" table ... G8
4" spindle, 120" bed L29
4" dia. spindle, 132" bed, 36" x 60" table .. P11
4" dia. spindle, 132" bed, 36" x 72" table .. P11
4" dia. spindle, 132" bed, 36" x 96" table .. P11
4" dia. spindle, 132" bed, 48" x 72" table .. P11
4" spindle, 144" bed L29
5" dia. spindle, 72" bed B51
5" spindle, 84" bed, 36" x 72" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 48" x 72" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 48" x 84" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 48" x 96" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 60" x 96" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 60" x 108" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 84" bed, 60" x 120" table, 36" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" dia. spindle, 96" bed B51
5" dia. spindle, 96" bed, 48" x 72" table ... G8
5" spindle, 96" bed L29
5" spindle, 96" bed, 36" x 72" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 48" x 72" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 48" x 84" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 48" x 96" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 60" x 96" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 60" x 108" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 96" bed, 60" x 120" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" dia. spindle, 120" bed B51
5" dia. spindle, 120" bed, 48" x 84" table ... G8
5" spindle, 120" bed L29
5" spindle, 120" bed, 48" x 84" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 48" x 96" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 48" x 108" table, 48" 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 60" x 96" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 60" x 108" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 60" x 120" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 60" x 144" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 72" x 120" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" spindle, 120" bed, 72" x 144" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
5" dia. spindle, 144" bed 48" x 96" table .. G8
5" dia. spindle, 144" bed, 48" x 120" table .. G8
5" dia. spindle, 144" bed, 48" x 132" table .. G8
5" dia. spindle, 144" bed, 60" x 96" table .. G8
5" dia. spindle, 144" bed, 60" x 120" table .. G8
5" spindle, 144" bed L29
5" spindle, 168" bed L29
5" dia. spindle C36
5" dia. spindle K6
6" spindle, 96" bed L29
6" dia. spindle, 120" bed, 60" x 96" table .. G8
6" spindle, 120" bed L29
6" spindle, 120" bed, 48" x 84" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 48" x 108" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 60" x 96" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 60" x 108" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 60" x 120" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 60" x 144" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 72" x 120" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" spindle, 120" bed, 72" x 144" table, 48" vertical travel; additional bed length and vertical travel in 12" increments ... O1
6" dia. spindle, 144" bed, 60" x 104" table .. G8
6" spindle, 144" bed L29
6" dia. spindle, 168" bed, 60" x 120" table .. G8
6" spindle, 168" bed L29
6" dia. spindle, 192" bed, 60" x 132" table .. G8
6" dia. spindle, 216" bed, 60" x 140" table .. G8
6" dia. spindle, 216" bed, 72" x 164" table .. G8
7" dia. spindle, 144" bed, 60" x 140" table .. G8
7" dia. spindle, 168" bed, 72" x 164" table .. G8
7" dia. spindle, 192" bed, 72" x 164" table .. G8
7" dia. spindle, 216" bed, 72" x 164" table .. G8
10" spindle C36
Up to 18" spindle M18
Special B9

Rotary Table Type

2⅛" dia. spindle, 60" bed, 30" x 36" table.. G8
2⅛" dia. spindle, 72" bed, 30" x 36" table.. G8
3" dia. spindle, 72" bed, 30" x 36" table .. G8
3" dia. spindle, 84" bed, 30" x 36" table .. G8
3⅛" spindle, 44" dia. round or 44" sq. table C10
4" dia. spindle, 96" bed, 48" x 48" table .. G8
4" spindle, 120" runway F9
4" dia. spindle, 120" bed, 60" x 60" table .. G8
5" dia. spindle, 96" bed, 60" x 60" table .. G8
5" dia. spindle, 120" bed, 60" x 60" table .. G8
5" dia. spindle, 144" bed, 60" x 60" table .. G8
Special B9
Special S23

Floor Type

3" drill cap., Drilling & Milling only ... C1
3½" spindle, 36", 48", 60" vert. travel, 48" horiz. travel C10
3½" spindle, 36", 48", 60" vert. travel, 72" horiz. travel C10
3½" spindle, 36", 48", 60" vert. travel, 96" horiz. travel C10
3½" spindle, 36", 48", 60" vert. travel, 120" horiz. travel C10
3½" spindle, 72", 84", 96" vert. travel, 48" horiz. travel C10
3½" spindle, 72", 84", 96" vert. travel, 72" horiz. travel C10
3½" spindle, 72", 84", 96", vert. travel, 96" horiz. travel C10
3½" spindle, 72", 84", 96" vert. travel, 120" horiz. travel C10
3½" spindle, 72", 84", 96" vert. travel, 144" horiz. travel C10
3½" spindle, 72", 84", 96", vert. travel, 168" horiz. travel C10
4" drill cap., Drilling & Milling only C1
5" spindle C36
5" spindle, 48" horizontal travel, 48" vertical travel; additional vertical and horizontal travel in 12" increments O1
5" spindle, 48" horizontal travel, 84" vertical travel; additional vertical and horizontal travel in 12" increments O1
5" spindle, 72" horizontal travel, 48" vertical travel; additional vertical and horizontal travel in 12" increments, Duplex Column O1
5" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 72" vert. travel G8
5" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 84" vert. travel G8
5" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 96" vert. travel G8
5" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 120" vert. travel G8
5" bar, 72" runway G20
5" bar, 96" runway G20
5" bar, 120" runway G20
5" bar, 144" runway G20
5" bar, 168" runway G20
5" bar, 192" runway G20
5" bar, 216" runway G20
6" dia. spindle, Boring and Facing Machine, Double End B11
6" spindle, 48" horizontal travel, 48" vertical travel; additional vertical and horizontal travel in 12" increments O1
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 72" vert. travel G8
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 84" vert. travel G8
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 96" vert. travel G8
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 120" vert. travel G8
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 144" vert. travel G8
6" spindle dia., 72" horiz. travel plus any additional length in 2' increments, 168" vert. travel G8
6" bar, 72" runway G20
6" bar, 96" runway G20
6" bar, 120" runway G20
6" bar, 144" runway G20
6" spindle, 168" runway B4
6" bar, 168" runway G20
6" bar, 192" runway G20
6" bar, 216" runway G20
6" bar, 240" runway G20
6" bar, 264" runway G20
6" bar, 288" runway G20
7" spindle dia., 96" horiz. travel plus any additional length in 2' increments, 96" vert. travel G8
7" spindle dia., 96" horiz. travel plus any additional length in 2' increments, 120" vert. travel G8
7" spindle dia., 96" horiz. travel plus any additional length in 2' increments, 144" vert. travel G8
7" spindle dia., 96" horiz. travel plus any additional length in 2" increments, 168" vert. travel G8
7" bar, 144" runway G20
7" bar, 168" runway G20
7" bar, 192" runway G20
7" bar, 216" runway G20
7" bar, 240" runway G20
7" bar, 264" runway G20
7" bar, 288" runway G20
7" bar, 312" runway G20
7" bar, 336" runway G20
7" bar, 30' runway G20

BORING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Horizontal Boring, Drilling & Milling Machines

Floor Type

(Continued)

5" spindle dia., 96" horiz. travel plus any additional length in 2" increments, 96" vert. travel ... G8
5" spindle dia., 96" horiz. travel plus any additional length in 2" increments, 124" vert. travel ... G8
5" spindle dia., 96" horiz. travel plus any additional length in 2" increments, 144" vert. travel ... G8
5" bar, 144" runway ... G20
5" bar, 168" runway ... G20
5" bar, 192" runway ... G20
5" bar, 216" runway ... G20
5" bar, 240" runway ... G20
5" bar, 264" runway ... G20
5" bar, 288" runway ... G20
5" bar, 312" runway ... G20
5" bar, 336" runway ... G20
5" bar, 30' runway ... G20
10" spindle ... C36
Specials ... B9
Special ... M36
Special Horizontal Floor Type Boring, Turning, Facing ... N2

Planer Type

5" spindle ... C36
5" dia. spindle, 48" to 144" table width, 72" vertical travel, 120" table travel or any additional length in 2" increments ... G8
5" dia. spindle, 48" to 144" table width, 84" vertical travel, 120" table travel or any additional length in 2" increments ... G8
5" dia. spindle, 48" to 144" table width, 96" vertical travel, 120" table travel or any additional length in 2" increments ... G8
5" dia. spindle, 48" to 144" table width, 120" vertical travel, 120" table travel or any additional length in 2" increments ... G8
5" dia. spindle, 48" to 144" table width, 144" vertical travel, 120" table travel or any additional length in 2" increments ... G8
6" spindle, 144" table length ... G20
6" spindle, 168" table length ... G20
6" spindle, 192" table length ... G20
6" spindle, 216" table length ... G20
6" spindle, 240" table length ... G20
7" dia. spindle, 60" to 144" table width, 96" vertical travel, 144" table travel or any additional length in 2" increments ... G8
7" dia. spindle, 60" to 144" table width, 120" vertical travel, 144" table travel or any additional length in 2" increments ... G8
7" dia. spindle, 60" to 144" table width, 144" vertical travel, 144" table travel or any additional length in 2" increments ... G8
7" spindle, 144" table length ... G20
7" spindle, 168" table length ... G20
7" spindle, 192" table length ... G20
7" spindle, 216" table length ... G20
7" spindle, 240" table length ... G20
8" dia. spindle, 72" to 144" table width, 96" vertical travel, 144" table travel or any additional length in 2" increments ... G8
8" dia. spindle 72" to 144" table width, 120" vertical travel, 144" table travel or any additional length in 2" increments ... G8
8" dia. spindle, 72" to 144" table width, 144" vertical travel, 144" table travel or any additional length in 2" increments ... G8
8" spindle, 144" table length ... G20
8" spindle, 168" table length ... G20
8" spindle, 192" table length ... G20
8" spindle, 216" table length ... G20
8" spindle, 240" table length ... G20
10" spindle ... C36
Special ... B9

Multiple Head Type

4" spindle ... K17
5" spindle ... K17
6" spindle ... K17
7" spindle ... K17
8" spindle ... K17
9" spindle ... K17
Special ... B9

Vertical Turning & Boring Machines

Standard

12" swing min., Automatic Cycle Vertical Contouring Lathe ... T18
16" swing, 42" table ... K10
16" swing, 42" table, One Ram & One Side Head ... K10
16" swing, 42" table, Two Rams ... K10
16" swing, 42" table, Two Rams & One Side Head ... K10
18" swing ... B19
62" swing, 42" dia. table ... G8
56" swing, 52" table ... K10
56" swing, 52" table, One Ram & One Side Head ... K10
56" swing, 52" table, Two Rams ... K10
56" swing, 52" table, Two Rams & One Side Head ... K10
57" swing, 64" dia. table ... G8
60" swing ... B19
60" swing, 48" dia. table, One Ram and One Grinding Spindle ... F17
66" swing, 62" table ... K10
66" swing, 62" table, One Ram & One Side Head ... K10
66" swing, 62" table, Two Rams ... K10
66" swing, 62" table, Two Rams & One Side Head ... K10
67" swing, 64" dia. table ... G8
72" swing ... B19
76" swing, 72" dia. table ... G8
76" swing, 72" table ... K10
76" swing, 72" table, One Ram & One Side Head ... K10
76" swing, 72" table, Two Rams ... K10
76" swing, 72" table, Two Rams & One Side Head ... K10
77" swing, 72" dia. table ... G8
84" swing ... B19
88" swing, 84" table, Two Rams ... K10
88" swing, 84" table, Two Rams & One Side Head ... K10
89" swing, 84" dia. table ... G8
96" swing ... B19
100" swing, Two Rams ... B4
100" swing and up ... C36
101" swing, 96" dia. table ... G8
102" swing, 96" table, Two Rams ... K10
102" swing, 96" table, Two Rams & One Side Head ... K10
103" swing, 96" dia. table ... G8
120" swing, Two Rams ... B4
120" swing ... B19
126" swing, 120" table, Two Rams ... K10
126" swing, 120" table, Two Rams & One Side Head ... K10
127" swing, 120" dia. table ... G8
144" swing, Two Rams ... B4
150" swing, 144" table, Two Rams ... K10
150" swing, 144" table, Two Rams & One Side Head ... K10
151" swing, 144" dia. table ... G8
168" swing, Two Rams ... B4
192" swing, Two Rams ... B4
240" swing, Two Rams ... B4
20' to 40' swing ... M18
40" swing ... B4
43" swing ... B4
36" dia. table, 24" vertical, 20"/24" horiz. stroke, Contouring Machine, Precision ... K10
Special ... B9
Special, Widened Type ... B9

Turret Type

30" swing ... B51
34" swing, 30" table ... K10
34" swing, 30" table, Turret & Side Head ... K10
36" swing ... B51
36" swing ... R16
40" swing, 36" table ... K10
40" swing, 36" table, Turret & Side Head ... K10
42" swing ... B51
46" swing, 42" table ... K10
46" swing, 42" table, Turret & Side Head ... K10
46" swing, 42" table, Turret & Ram ... K10
46" swing, 42" table, Turret, Ram & Side Head ... K10
48" swing, Vertical Side Head, One Side Head & One Turret Head ... B4
51" swing ... B51
56" swing, 52" table ... K10
56" swing, 52" table, One Turret & One Side Head ... K10
56" swing, 52" table, Turret & Ram ... K10
56" swing, 52" table, Turret, Side Head & Ram ... K10
64" swing ... B51
66" swing, 62" table ... K10
66" swing, 62" table, One Turret & One Side Head ... K10
66" swing, 62" table, Turret & Ram ... K10
66" swing, 62" table, Turret, Ram & Side Head ... K10
74" swing ... B51
76" swing, 72" table ... K10
76" swing, 72" table, One Turret & One Side Head ... K10
76" swing, 72" table, Turret & Ram ... K10
76" swing, 72" table, Turret, Ram & Side Head ... K10
88" swing, 84" table, Turret & Ram ... K10
88" swing, 84" table, Turret, Side Head Ram ... K10
102" swing, 96" table, Turret & Ram ... K10
102" swing, 96" table, Turret, Ram & Side Head ... K10
126" swing, 120" table, Turret & Ram ... K10
126" swing, 120" table, Turret, Ram & Side Head ... K10
150" swing, 144" table, Turret & Ram ... K10
150" swing, 144" table, Turret, Ram & Side Head ... K10

Extension Type

120" to 192" swing, Two Rams, 1 Boring Bench ... B4
168" to 240" swing, Two Rams, 1 Boring Bench ... B4
192" to 288" swing, Two Rams, 1 Boring Bench ... B4
200" swing, 144" to 192" dia. table ... G8
Special ... B9

Fixed-Rail Type

100" swing and up ... C36
Special ... B9

BORING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Precision Boring Machines

Horizontal Bridge, Single End

4" dia., 8" table travel ... H13
4" dia. bore, 9" table travel ... S17
4" dia., 12" table travel ... H13
4" dia. bore, 14" table travel ... S17
6" dia., 8" table travel, 3 spindle ... N7
6" dia., 8" table travel, 4 spindle ... N7
6" dia. bore, 12" table travel ... E19
6" dia. bore, 14" table travel ... E19
6" dia., 15" table travel ... H13
8" swing, 6" table travel ... B16
8" dia. bore, 15" table travel ... S17
8" dia. bore, 16" table travel ... E19
8" dia., 18" table travel ... H13
8" dia. bore, 20" table travel ... E19
8" dia., 20" table travel ... H13
8" dia. bore, 25" table travel ... E19
10" dia., 16" table travel, 4 spindle ... N7
10" dia., 20" table travel ... H13
12" dia., 16" table travel ... H13
12" dia., 30" table travel ... H13
Special ... B9
Special ... P7

Horizontal Bridge, Double End

4" dia. bore, 9" table travel ... S17
4" dia., 12" table travel ... H13
4" dia. bore, 14" table travel ... S17
6" dia. bore, 12" table travel ... E19
6" dia., 15" table travel ... H13
6" dia. bore, 18" table travel ... E19
6" dia., 16" work length, 8 spindle ... N7
8" dia. bore, 15" table travel ... S17
8" dia. bore, 16" table travel ... S17
8" dia. bore, 18" table travel ... E19
8" dia., 18" table travel ... H13
10" dia., 20" table travel ... H13
12" dia., 30" table travel ... H13
Special ... B9
Special ... P7

Horizontal Way Type

10" table travel, 2 Way ... H13
10" table travel, 3 Way ... H13
12" table travel, 2 Way ... H13
12" table travel, 3 Way ... H13
11½" to 17½" table travel, 1 Way ... E19
11½" to 17½" table travel, 2 Way ... E19
11½" to 17½" table travel, 3 Way ... E19
11½" to 17½" table travel, 4 Way ... E19
15½" to 21½" table travel, 1 Way ... E19
15½" to 21½" table travel, 2 Way ... E19
15½" to 21½" table travel, 3 Way ... E19
15½" to 21½" table travel, 4 Way ... E19

Horizontal Knee Type

2¼" spindle ... B12
... S17

Vertical

4" dia., 1 spindle ... H13
10" dia. bore, 16" depth, max. bore, Cylinder Boring ... E19
14" max dia., 3 spindle ... H13
36" dia. table ... E19
1 spindle ... B12
6 spindle ... B12
Special ... B9

Angular Way Type

6" dia., 2 spindle ... H13
10" dia. bore, 18" table travel, Single End Cylinder Boring ... E19
10" dia. bore, 18" table travel, Double End, Cylinder Boring ... E19

One way ... S17
Two way ... S17
Three way ... S17
Four way ... S17
Special ... B9

Jig Boring Machines

Horizontal

3" dia. spindle, 48" bed ... D11
3" dia. spindle, 72" bed ... D11
3" dia. spindle, 96" bed ... D11
4" dia. spindle, 60" bed ... D11
4" dia. spindle, 72" bed ... D11
4" dia. spindle, 96" bed ... D11
4" dia. spindle, 120" bed ... D11
16" travel, 16" rotary table, Rotary Table ... K4

Vertical

10" table travel ... L22
14½" table travel, 10" x 16" ... M33
16½" table travel, 10" x 19" ... M33
18" x 12" table travel ... P17
18" travel, 22½" x 14" table, Rotary Table ... K4
18" x 30" table travel ... C18
18" x 36" table travel ... C18
24" travel, 30" x 18" table, Rotary Table ... K4
28" x 18" table travel ... K13
30" table travel ... C8
30" table travel ... F13
30" x 30" table travel ... K13
36" x 12" table travel ... P17
36" x 18" table travel ... P17
36" x 22" table travel ... P17
42" x 22" table travel ... F13
48" x 24" table travel ... P17
60" x 36" table travel ... P17
60" x 30" table travel ... P17

Boring Machines Not Elsewhere Classified

3" dia., Boring Machine, Cylinder, Horizontal ... B11
3½" dia., 2 spindle, Boring Machine, Cylinder, Horizontal ... B11
3½" dia. bar, 48" travel, Boring & Drilling Machine, Horiz., Crank Pin ... E15
3¼" dia. Boring Machine, Cylinder, Horizontal ... B11
3½" dia. spindle, Boring Machine, Cylinder, Locomotive ... B11
3¾" dia., 3 spindle, Boring Machine, Cylinder, Horizontal ... B11
5" dia. Boring Machine, Cylinder, Horizontal ... B11
5" dia., 4 spindle, Boring Machine, Horizontal ... B11
6" dia., Boring Machine, Cylinder, Horizontal ... B11
7" dia., Boring Machine, Cylinder, Horizontal ... B11
7" dia., 4 spindle, Boring Machine, Cylinder, Horizontal ... B11
8" dia. spindle, Boring Machine, Cylinder, Locomotive ... B11
8" dia., Boring Machine, Cylinder, Horizontal ... B11
10" dia., 2 spindle, Boring Machine, Cylinder, Horizontal ... B11
1 to 4 spindles, Cylinder, Multiple Spindle, Rail Feed, Vertical ... M31
2 to 8 spindles, Cylinder, Multiple Spindle, Rail Feed, Vertical ... M31
8 or more spindles, Cylinder, Multiple Spindle, Rail Feed, V Type ... M31

Special, Cylinder, "V" Type ... H
Special, Cylinder, Vertical ... H
Special, Cylinder Boss Boring ... W2
42" swing, Car Wheel Boring, Vertical ... B4
48" swing, Car Wheel Boring, Vertical ... B4
52" swing, Car Wheel Boring ... C36
54" swing, Car Wheel Boring, Vertical ... B4
52" swing, Diesel Wheel Boring ... C36
5½" x 10" boxes, Car Box Boring, Horizontal 2 spindle ... B4
7" x 14" boxes, Car Box Boring, Horizontal 2 spindle ... B4
72" Tire Boring ... B4
90" Tire Boring ... B4
102" Tire Boring ... B4
Special, Tire Boring, Fixed Rail ... C36
Special, Tire Boring, Movable Rail ... C36
Special, Car Journal Boring ... M36
2" to 4½" pipe Coupling, Double End ... S29
4½" to 8⅝" pipe Coupling, Double End ... S29
8⅝" to 13⅜" pipe Coupling, Double End ... S29
Any size up to 13⅜" dia. pipe, Boring machine couplings ... To
11¾" dia., 9" dia. bore, Double End ... To
15" swing, 22" long, Double End ... B4
22" dia. chuck, Double End ... To
23" swing, 60" long, Hollow Spindle, Single End ... B4
31" swing, 80" long, Double End ... B4
41" swing, 80" long, Double End ... B4
45" swing, 80" long, Double End ... B4
49" swing, 100" long, Double End ... B4
51" swing, 35" long, Single End ... B4
11" to 17" dia., Boring & Grinding Machine, Tube Redressing Dies ... S29

17" to 23" dia., Boring & Grinding Machine, Tube Redressing Dies ... S29
4½" dia., 7" long, Groover, Oil, Continuous, Vertical ... W18
6" max. dia., Facing and Grooving Machine, Horizontal, Single End ... H13
⅝" to 8" dia. bore, up to 12" stroke ... H29
1 spindle, 4" dia., Boring, Hydraulic, Horizontal ... M31
2 spindle, up to 4" valve, Boring & Facing Machine, Valve Double End ... S29
48" vertical and horizontal travel, Portable, Boring and Facing ... F12
1 spindle, Boring & Facing Machine ... N7
4 individual units, Boring & Tapping, Horizontal, Pipe Coupling ... M31
250 to 1000 lb. Bomb, Boring & Tapping Machine, Bomb, Double End ... S29
3 units ... M31
4 spindle, 2 head units ... M31
Special, Horizontal Boring and Facing ... C36
Special, Comb. Boring & Tapping ... F7
Special, Duplex ... F7
Special, Horizontal ... F7
Special, Vertical Spindle ... F7
way type, Armor Plate, Horiz. ... LH
way type, Line, Horizontal ... LH
Special, Process, Special Design ... H
Special Sleeve, 2 spindle Vertical ... H
Special, Vertical ... H
Special, Horizontal, Openside ... H
Boring Machine, Two Way ... S23

DRILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Sensitive Bench

Box Column

.001" to ¼" cap., 7" swing N4
.001" to ½" cap., 11" swing N4
.001" to ¾" cap., 24" swing N4
" cap., 6½" swing, 3 spindle S20
.0005" to .0135" dia. drill N4
" dia., 14" swing P25
" dia., 14" swing, 2 spindle P25
" dia., 14" swing, 3 spindle P25
" dia., 14" swing, 4 spindle P25
" dia., 14" swing, 5 spindle P25
" dia., 14" swing, 6 spindle P25
¼" dia. drill cap., 1, 2, 3, or 4 spindle S14
" cap., 16" swing A12
" cap., 16" swing C11
" cap., 16" swing, 2 spindle A12
" cap., 16" swing, 2 spindle C11
" cap., 16" swing, 3 spindle A12
" cap., 16" swing, 3 spindle C11
" cap., 16" swing, 4 spindle A12
" cap., 16" swing, 4 spindle C11
" cap., 16" swing, 5 spindle A12
" cap., 16" swing, 6 spindle A12
" cap., 16" swing, 6 spindle C11
" cap., 21" swing A12
" cap., 21" swing, 2 spindle A12
" cap., 21" swing, 3 spindle A12
" cap., 21" swing, 4 spindle A12
" cap., 21" swing, 5 spindle A12
" cap., 21" swing, 6 spindle A12
⅜" cap., Single & Multiple Spindle T14
⅜" dia., 12" swing L16
⅜" dia., 12" swing, 2 spindle L16
⅜" dia., 12" swing, 3 spindle L16
⅜" dia., 12" swing, 4 spindle L16
⅜" cap., 12½" swing A25
⅜" cap., 12½" swing, 2 spindle A25
⅜" cap., 12½" swing, 3 spindle A25
⅜" cap., 12½" swing, 4 spindle A25
⅜" cap., 12½" swing, 6 spindle A25
⅜" cap., 15" swing A25
⅜" cap., 15" swing C6
⅜" cap., 15" swing, 2 spindle A25
⅜" cap., 15" swing, 3 spindle A25
⅜" cap., 15" swing, 4 spindle A25
⅜" cap., 15" swing, 5 spindle A25
⅜" cap., 15" swing, 6 spindle A25
⅜" cap., 15" swing, 8 spindle A25
⅜" cap., 16" swing C11
⅜" cap., 16" swing, 2 spindle C11
⅜" cap., 16" swing, 3 spindle C11
⅜" cap., 16" swing, 4 spindle C11
⅜" cap., 16" swing, 6 spindle C11
⅜" dia., 20" swing L16
⅜" dia., 20" swing, 2 spindle L16
⅜" dia., 20" swing, 3 spindle L16
⅜" dia., 20" swing, 4 spindle L16
⅝" cap., 16" swing C11
⅝" cap., 16" swing, 2 spindle C11
⅝" cap., 16" swing, 3 spindle C11
⅝" cap., 16" swing, 4 spindle C11
⅝" cap., 16" swing, 6 spindle C11
⅝" cap., 12" swing C6
½" cap., 14" swing B47
½" cap., 14" swing, 2 spindle B47
½" cap., 14" swing, 3 spindle B47
½" cap., 14" swing, 4 spindle B47
½" cap., 14" swing, 6 spindle B47
½" cap., 15" swing A25
½" cap., 15" swing C6
½" cap., 15" swing, 2 spindle R33
½" cap., 15" swing, 2 spindle B47
½" cap., 15" swing, 2 spindle W6
½" cap., 15" swing, 3 spindle R33
½" cap., 15" swing, 3 spindle B47

Round Column

0 to ⅛" cap L19
.004" to ⅜" cap., 8" swing, Variable Speed ..... ES
.004" to ⅜" cap., 8" swing, Variable Speed ..... ES
#72 to ¼", 14" swing D6
#72 to ¼", 14" swing, 2 spindle D6
#72 to ¼", 14" swing, 3 spindle D6
#72 to ¼", 14" swing, 4 spindle D6
#60 to ⅜" cap., 8" swing, Variable Speed ..... ES
#60 to ⅜" cap., 8" swing, Variable Speed ..... ES
.040" cap., 22" swing T4
.065" cap., 22" swing T4
¼" cap., 22" swing T4
¼" cap., 3¼" swing S20
¼" dia., 6" swing, Bench H19
¼" dia., 6" swing, Pedestal H19
¼" dia., 6" swing, 2 spindle, Bench H19
¼" dia., 6" swing, 3 spindle, Bench H19
¼" dia., 6" swing, 4 spindle, Bench H19
¼" dia., 6" swing, 5 spindle, Bench H19
¼" dia., 6" swing, 6 spindle, Bench H19
¼" cap., 6½" swing H4
¼" cap., 20" swing T4
⅜" cap., 10" swing H4
⅜" cap., 16" swing H1
⅜" cap., 20" swing T4
⅜" cap., 14" swing D6
⅜" cap., 20" swing T4
½" cap., 10" swing C6
½" cap., 11" swing W6
½" cap., 12" swing C6
½" cap., 12½" swing A21
½" cap., 13" swing W6
½" cap., 14" swing C6
½" chuck, 14½" swing S25
½" cap., 15" swing A21
½" cap., 15" swing R33
½" cap., 15" swing B47
½" cap., 15" swing F1
½" cap., 15" swing W6
½" cap., 15" swing, 2 spindle R33
½" cap., 15" swing, 2 spindle B47
½" cap., 15" swing, 2 spindle W6
½" cap., 15" swing, 3 spindle R33
½" cap., 15" swing, 3 spindle B47
½" cap., 15" swing, 3 spindle W6
½" cap., 15" swing, 4 spindle B47
½" cap., 15" swing, 4 spindle W6
½" cap., 15" swing, 6 spindle B47
½" cap., 15½" swing, 1, 2, 3 & 4 spindles D20
½" cap., 16" swing C6
½" cap., 16" swing C11
½" cap., 16" swing, 2 spindle C11
½" cap., 16" swing, 3 spindle C11
½" cap., 16" swing, 4 spindle C11
½" cap., 16" swing, 5 spindle C11
½" cap., 16" swing, 6 spindle C11
½" cap., 17" swing D6
½" cap., 20" swing T4
⅝" cap., 15" swing R33
⅝" cap., 15" swing, 2 spindle R33
⅝" cap., 15" swing, 3 spindle R33
⅝" cap., 15" swing, 4 spindle R33
⅝" cap., 20" swing T4
⅝" cap., 12" swing C6
⅝" cap., 18" swing C11
⅝" cap., 18" swing, 2 spindle C11
⅝" cap., 18" swing, 3 spindle C11
⅝" cap., 18" swing, 4 spindle C11
⅝" cap., 18" swing, 5 spindle C11
⅝" cap., 18" swing, 6 spindle C11
⅝" cap., 16" swing B47
⅝" cap., 16" swing, 2 spindle B47
⅝" cap., 16" swing, 3 spindle B47
⅝" cap., 16" swing, 4 spindle B47
⅝" cap., 16" swing, 6 spindle B47
⅝" cap., 18" swing C11
⅝" cap., 18" swing, 2 spindle C11
⅝" cap., 18" swing, 3 spindle C11
⅝" cap., 18" swing, 4 spindle C11
⅝" cap., 18" swing, 5 spindle C11
⅝" cap., 18" swing, 6 spindle C11
⅝" cap., 21" swing B47
⅝" cap., 21" swing, 2 spindle B47
⅝" cap., 21" swing, 3 spindle B47
⅝" cap., 21" swing, 4 spindle B47
⅝" cap., 21" swing, 6 spindle B47
⅝" cap., 30" swing B47
⅝" cap., 30" swing, 2 spindle B47
⅝" cap., 30" swing, 3 spindle B47
⅝" cap., 30" swing, 4 spindle B47
⅝" cap., 30" swing, 6 spindle B47
1" cap., 18" swing B47
1" cap., 18" swing C11
1" cap., 18" swing, 2 spindle B47
1" cap., 18" swing, 2 spindle C11
1" cap., 18" swing, 3 spindle B47
1" cap., 18" swing, 3 spindle C11
1" cap., 18" swing, 4 spindle B47
1" cap., 18" swing, 4 spindle C11
1" cap., 18" swing, 5 spindle C11
1" cap., 18" swing, 6 spindle B47
1" cap., 18" swing, 6 spindle C11
1" cap., 20" swing W6
1" cap., 20" swing, 2 spindle W6
1" cap., 20" swing, 3 spindle W6
1" cap., 20" swing, 4 spindle W16
1" cap., 20" swing, 5 spindle W6
1" cap., 20" swing, 6 spindle W6
No. 2 M. T., 15" swing A21

Sensitive Floor and Pedestal

Box Column

#60 to ¼" cap., 14½" swing S22
⅛" to ⅜" cap., 14½" swing S22
" dia., 14" swing P25
" dia., 14" swing, 2 spindle P25
" dia., 14" swing, 3 spindle P25
" dia., 14" swing, 4 spindle P25
" dia., 14" swing, 5 spindle P25
" dia., 14" swing, 6 spindle P25
" cap., 16" swing A12
" cap., 16" swing, Sliding Head C11
" cap., 16" swing, 2 spindle A12
" cap., 16" swing, 2 spindle, Sliding Head C11
" cap., 16" swing, 3 spindle A12
" cap., 16" swing, 3 spindle, Sliding Head C11
" cap., 16" swing, 4 spindle A12
" cap., 16" swing, 4 spindle, Sliding Head C11
" cap., 16" swing, 5 spindle A12
" cap., 16" swing, 6 spindle A12
" cap., 16" swing, 6 spindle, Sliding Head C11
" cap., 21" swing A12
" cap., 24" swing, 2 spindle A12
" cap., 24" swing, 3 spindle A12
" cap., 24" swing, 4 spindle A12
" cap., 24" swing, 5 spindle A12
" cap., 24" swing, 6 spindle A12
⅜" dia., 12" swing L16
⅜" dia., 12" swing, 2 spindle L16
⅜" dia., 12" swing, 3 spindle L16
⅜" dia., 12" swing, 4 spindle L16
⅜" dia., 12" swing, 5 spindle L16
⅜" dia., 12" swing, 6 spindle L16
⅜" cap., 12½" swing A25
⅜" cap., 12½" swing, 2 spindle A25
⅜" cap., 12½" swing, 3 spindle A25
⅜" cap., 12½" swing, 4 spindle A25
⅜" cap., 12½" swing, 6 spindle A25
⅜" cap., 15" swing A25
⅜" cap., 15" swing, 2 spindle A25
⅜" cap., 15" swing, 3 spindle A25
⅜" cap., 15" swing, 4 spindle A25
⅜" cap., 15" swing, 5 spindle A25
⅜" cap., 15" swing, 6 spindle A25
⅜" cap., 16" swing, Sliding Head C11
⅜" cap., 16" swing, 2 spindle, Sliding Head C11
⅜" cap., 16" swing, 3 spindle, Sliding Head C11
⅜" cap., 16" swing, 4 spindle, Sliding Head C11
⅜" cap., 16" swing, 6 spindle, Sliding Head C11
⅜" cap., 12" swing A25
⅜" cap., 12" swing, 2 spindle A25
⅜" cap., 12" swing, 3 spindle A25
⅜" cap., 12" swing, 4 spindle A25
⅜" cap., 12" swing, 6 spindle A25
⅜" cap., 14" swing B47
⅜" cap., 14" swing, 2 spindle B47
⅜" cap., 14" swing, 3 spindle B47
⅜" cap., 14" swing, 4 spindle B47
⅜" cap., 14" swing, 6 spindle B47
⅜" cap., 15" swing A25
⅜" cap., 15" swing, 2 spindle A25
⅜" cap., 15" swing, 3 spindle A25
⅜" cap., 15" swing, 4 spindle A25
⅜" cap., 15" swing, 5 spindle A25
⅜" cap., 15" swing, 6 spindle A25
⅜" cap., 16" swing, Sliding Head C11
⅜" cap., 16" swing, 2 spindle, Sliding Head C11
⅜" cap., 16" swing, 3 spindle, Sliding Head C11
⅜" cap., 16" swing, 4 spindle, Sliding Head C11
⅜" cap., 16" swing, 6 spindle, Sliding Head C11
½" cap., 12" swing A25
½" cap., 12" swing, 2 spindle A25
½" cap., 12" swing, 3 spindle A25
½" cap., 12" swing, 4 spindle A25
½" cap., 12" swing, 6 spindle A25
½" cap., 14" swing B47
½" cap., 14" swing, 2 spindle B47
½" cap., 14" swing, 3 spindle B47
½" cap., 14" swing, 4 spindle B47
½" cap., 14" swing, 6 spindle B47
½" cap., 15" swing A25

(Code number following each listing indicates manufacturer, key on page 82)

Sensitive Floor and Pedestal

Box Column

(Continued)

- ½" cap., 15" swing, 2 spindle ... A25
- ½" cap., 15" swing, 3 spindle ... A25
- ½" cap., 15" swing, 4 spindle ... A25
- ½" cap., 15" swing, 6 spindle ... A25
- ½" cap., 14" swing ... A12
- ½" cap., 14" swing, Sliding Head ... C11
- ½" cap., 14" swing, 2 spindle ... A12
- ½" cap., 14" swing, 3 spindle ... A12
- ½" cap., 14" swing, 4 spindle ... A12
- ½" cap., 14" swing, 5 spindle ... A12
- ½" cap., 14" swing, 6 spindle ... A12
- ½" cap., 16" swing, Sliding Head ... C11
- ½" cap., 16" swing, 2 spindle, Sliding Head ... C11
- ½" cap., 16" swing, 3 spindle, Sliding Head ... C11
- ½" cap., 16" swing, 4 spindle, Sliding Head ... C11
- ½" cap., 16" swing, 6 spindle, Sliding Head ... C11
- ½" dia., 16" swing ... P25
- ½" dia., 16" swing, 2 spindle ... P25
- ½" dia., 16" swing, 3 spindle ... P25
- ½" dia., 16" swing, 4 spindle ... P25
- ½" dia., 16" swing, 5 spindle ... P25
- ½" dia., 16" swing, 6 spindle ... P25
- ½" cap., 24" swing ... A12
- ½" cap., 24" swing, 2 spindle ... A12
- ½" cap., 24" swing, 3 spindle ... A12
- ½" cap., 24" swing, 4 spindle ... A12
- ½" cap., 24" swing, 5 spindle ... A12
- ½" cap., 24" swing, 6 spindle ... A12
- ½" dia., 24" swing ... P25
- ½" dia., 24" swing, 2 spindle ... P25
- ½" dia., 24" swing, 3 spindle ... P25
- ½" dia., 24" swing, 4 spindle ... P25
- ½" dia., 24" swing, 5 spindle ... P25
- ½" dia., 24" swing, 6 spindle ... P25
- ¾" cap., 14" swing, Sliding Head ... C11
- ¾" cap., 16" swing, Sliding Head ... C11
- ¾" cap., 16" swing, 2 spindle, Sliding Head ... C11
- ¾" cap., 16" swing, 3 spindle, Sliding Head ... C11
- ¾" cap., 16" swing, 4 spingle, Sliding Head ... C11
- ¾" cap., 16" swing, 6 spindle, Sliding Head ... C11
- ¾" cap., 15" swing ... A25
- ¾" cap., 15" swing, 2 spindle ... A25
- ¾" cap., 15" swing, 3 spindle ... A25
- ¾" cap., 15" swing, 4 spindle ... A25
- ¾" cap., 15" swing, 5 spindle ... A25
- ¾" cap., 15" swing, 6 spindle ... A25
- ¾" cap., 15" swing, 8 spindle ... A25
- ¾" cap., 16" swing ... A12
- ¾" cap., 16" swing ... B47
- ¾" dia., 16" swing ... F9
- ¾" cap., 16" swing, 2 spindle ... A12
- ¾" cap., 16" swing, 2 spindle ... B47
- ¾" dia., 16" swing, 2 spindle ... F9
- ¾" cap., 16" swing, 3 spindle ... A12
- ¾" cap., 16" swing, 3 spindle ... B47
- ¾" dia., 16" swing, 3 spindle ... F9
- ¾" cap., 16" swing, 4 spindle ... A12
- ¾" cap., 16" swing, 4 spindle ... B47
- ¾" dia., 16" swing, 4 spindle ... F9
- ¾" cap., 16" swing, 5 spindle ... A12
- ¾" cap., 16" swing, 5 spindle ... B47
- ¾" cap., 16" swing, 6 spindle ... A12
- ¾" cap., 16" swing, 6 spindle ... B47
- ¾" dia., 16" swing, 6 spindle ... F9
- ¾" cap., 24" swing ... A12
- ¾" cap., 24" swing, 1 spindle ... A25
- ¾" dia., 24" swing ... F9
- ¾" cap., 24" swing, 2 spindle ... A12
- ¾" cap., 24" swing, 2 spindle ... A25
- ¾" dia., 24" swing, 2 spindle ... F9
- ¾" cap., 24" swing, 3 spindle ... A12
- ¾" cap., 24" swing, 3 spindle ... A25
- ¾" dia., 24" swing, 3 spindle ... F9
- ¾" cap., 24" swing, 4 spindle ... A12
- ¾" cap., 24" swing, 4 spindle ... A25
- ¾" dia., 24" swing, 4 spindle ... F9
- ¾" cap., 24" swing, 5 spindle ... A12
- ¾" cap., 24" swing, 5 spindle ... A25
- ¾" cap., 24" swing, 6 spindle ... A12
- ¾" cap., 24" swing, 6 spindle ... A25
- ¾" dia., 24" swing, 6 spindle ... F9
- ¾" cap., 24" swing, 8 spindle ... A25
- ¾" cap., 26" swing ... B47
- ¾" cap., 26" swing, 2 spindle ... B47
- ¾" cap., 26" swing, 3 spindle ... B47
- ¾" cap., 26" swing, 4 spindle ... B47
- ¾" cap., 26" swing, 5 spindle ... B47
- ¾" cap., 26" swing, 6 spindle ... B47
- ¾" cap., 30" swing ... A12
- ¾" cap., 30" swing ... A25
- ¾" cap., 30" swing, 2 spindle ... A12
- ¾" cap., 30" swing, 2 spindle ... A25
- ¾" cap., 30" swing, 3 spindle ... A12
- ¾" cap., 30" swing, 3 spindle ... A25
- ¾" cap., 30" swing, 4 spindle ... A12
- ¾" cap., 30" swing, 4 spindle ... A25
- ¾" cap., 30" swing, 5 spindle ... A12
- ¾" cap., 30" swing, 5 spindle ... A25
- ¾" cap., 30" swing, 6 spindle ... A12
- ¾" cap., 30" swing, 6 spindle ... A25
- ¾" cap., 30" swing, 8 spindle ... A25
- 1" cap., 14" swing, Sliding Head ... C11
- 1" cap., 16" swing, Sliding Head ... C11
- 1" cap., 16" swing, 2 spindle, Sliding Head ... C11
- 1" cap., 16" swing, 3 spindle, Sliding Head ... C11
- 1" cap., 16" swing, 4 spindle, Sliding Head ... C11
- 1" cap., 16" swing, 6 spindle, Sliding Head ... C11
- 1" cap., 21" swing ... A25
- 1" cap., 21" swing ... F13
- 1" cap., 24" swing, 2 spindle ... F13
- 1" cap., 24" swing, 3 spindle ... F13
- 1" cap., 24" swing, 4 spindle ... F13
- 1" cap., 24" swing, 5 spindle ... F13
- 1" cap., 24" swing, 6 spindle ... F13
- 1⅛" cap., 16" swing ... A12
- 1⅛" cap., 16" swing, 2 spindle ... A12
- 1⅛" cap., 16" swing, 3 spindle ... A12
- 1⅛" cap., 16" swing, 4 spindle ... A12
- 1⅛" cap., 16" swing, 5 spindle ... A12
- 1⅛" cap., 16" swing, 6 spindle ... A12
- 1⅛" cap., 24" swing ... A12
- 1⅛" cap., 24" swing ... A25
- 1⅛" cap., 24" swing, 2 spindle ... A12
- 1⅛" cap., 24" swing, 2 spindle ... A25
- 1⅛" cap., 24" swing, 3 spindle ... A12
- 1⅛" cap., 24" swing, 3 spindle ... A25
- 1⅛" cap., 24" swing, 4 spindle ... A12
- 1⅛" cap., 24" swing, 4 spindle ... A25
- 1⅛" cap., 24" swing, 5 spindle ... A12
- 1⅛" cap., 24" swing, 6 spindle ... A12
- 1⅛" cap., 24" swing, 6 spindle ... A25
- 1⅛" cap., 30" swing ... A12
- 1¼" cap., 30" swing, 2 spindle ... A12
- 1¼" cap., 30" swing, 3 spindle ... A12
- 1¼" cap., 30" swing, 4 spindle ... A12
- 1¼" cap., 30" swing, 5 spindle ... A12
- 1¼" cap., 30" swing, 6 spindle ... A12
- 1¼" cap., 24" swing ... A12
- 1¼" cap., 24" swing ... A25
- 1¼" cap., 24" swing, 2 spindle ... A12
- 1¼" cap., 24" swing, 2 spindle ... A25
- 1¼" cap., 24" swing, 3 spindle ... A12
- 1¼" cap., 24" swing, 3 spindle ... A25
- 1¼" cap., 24" swing, 4 spindle ... A12
- 1¼" cap., 24" swing, 4 spindle ... A25
- 1¼" cap., 24" swing, 5 spindle ... A12
- 1¼" cap., 24" swing, 6 spindle ... A12
- 1¼" cap., 24" swing, 6 spindle ... A25
- 1¼" cap., 26" swing ... B47
- 1¼" cap., 26" swing, 2 spindle ... B47
- 1¼" cap., 26" swing, 3 spindle ... B47
- 1¼" cap., 26" swing, 4 spindle ... B47
- 1¼" cap., 26" swing, 5 spindle ... B47
- 1¼" cap., 26" swing, 6 spindle ... B47
- 1½" cap., 24" swing ... F13
- 1½" cap., 24" swing, 2 spindle ... F13
- 1½" cap., 24" swing, 3 spindle ... F13
- 1½" cap., 24" swing, 4 spindle ... F13
- 1½" cap., 24" swing, 6 spindle ... F13
- ½ hp, 10 spindle, Drilling & Tapping ... N2
- 2 hp, 12 spindle, Drilling & Tapping ... N2
- 3 hp, 8 spindle, Drilling & Tapping ... N2
- 3 hp, 24 spindle, Drilling & Tapping ... N2
- 5, 5, & 7½ hp, Cam Feed ... N2
- 5 hp ... N2
- 5 hp, Fixed Center Head ... N2
- 5 hp, 8 spindle, Adjustable Head ... N2
- 5 hp, 12 spindle, Drilling & Tapping ... N2
- 5 hp, 16 spindle, Adjustable Head ... N2
- 5 hp, 20 spindle, Adjustable Head ... N2
- 5 hp, 20 spindle, Drilling & Tapping, Adjustable Head ... N2
- 5-7½ hp, Drilling & Tapping, Fixed Center Head ... N2
- 7½ hp, Drilling and Tapping ... N2
- 7½ hp, 16 Spindle, Drilling and Tapping, Adjustable Head ... N2
- 7½ hp, 18 spindle, Drilling & Tapping, Adjustable Head ... N2
- 7½ hp, 24 spindle, Drilling and Tapping, Adjustable Head ... N2
- 7½ hp, 30 spindle, Drilling and Tapping, Adjustable Head ... N2
- 7½ hp, 32 spindle, Drilling & Tapping, Adjustable Head ... N2
- 10 hp, 12 spindle, Drilling & Tapping, Adjustable Head ... N2
- 10 hp, 16 spindle, Drilling & Tapping, Adjustable Head ... N2
- 10 hp, 18 spindle, Drilling & Tapping, Adjustable Head ... N2
- 10 hp, 24 spindle, Drilling & Tapping, Adjustable Head ... N2
- 10-15 hp, Drilling and Tapping ... N2
- 10-15 hp, Drilling and Tapping, Fixed Center Head ... N2
- 10-15 hp, 12 spindle, Drilling and Tapping, Adjustable Head ... N2
- 10-15 hp, 16 spindle, Drilling and Tapping, Adjustable Head ... N2
- 10-15 hp, 24 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15 hp, 12 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 22 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 24 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 31 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 42 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 48 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15 hp, 60 spindle, Drilling & Tapping, Adjustable Head ... N2
- 15-20-25 hp, Drilling and Tapping ... N2
- 15-20-25 hp, Drilling and Tapping, Fixed Center Head ... N2
- 15-20-25 hp, 16 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 20 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 24 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 36 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 42 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 48 spindle, Drilling and Tapping, Adjustable Head ... N2
- 15-20-25 hp, 60 spindle, Drilling and Tapping, Adjustable Head ... N2
- 30-40 hp, 26 spindle, Drilling and Tapping, Adjustable Head ... N2
- 30-40 hp, 36 spindle, Drilling and Tapping, Adjustable Head ... N2
- 30-40-50 hp, Drilling and Tapping, Fixed Center Head ... N2
- 40-50 hp, 16 spindle, Drilling and Tapping, Adjustable Head ... N2
- 40-50 hp, 26 spindle, Drilling and Tapping, Adjustable Head ... N2
- 40-50 hp, 36 spindle, Drilling and Tapping, Adjustable Head ... N2

Round Column

- ⅛"-½" cap., 16" swing, Floor & Bench ... E8
- ¼" cap., 20" swing ... T4
- ⅛" cap., 20" swing ... T4
- ⅜" cap., 14" swing ... D6
- ⅜" cap., 14" swing, 2 spindle ... D6
- ⅜" cap., 14" swing, 3 spindle ... D6
- ⅜" cap., 14" swing, 4 spindle ... D6
- ⅜" cap., 14" swing, 5 spindle ... D6
- ⅜" cap., 14" swing, 6 spindle ... D6
- ⅜" cap., 14" swing, 8 spindle ... D6
- ⅜" cap., 15" swing ... C5
- ⅜" cap., 20" swing ... T4
- ½" dia. drill, 12" swing, Drilling Center Grinder, Comb ... D2
- ½" chuck, 14½" swing ... S25
- ½" cap., 15" swing ... A21
- ½" cap., 15" swing ... B33
- ½" cap., 15" swing ... B47
- ½" cap., 15" swing ... C5
- ½" cap., 15" swing ... F1
- ½" cap., 15" swing ... W6
- ½" cap., 15" swing, 2 spindle ... B33
- ½" cap., 15" swing, 2 spindle ... F1
- ½" cap., 15" swing, 2 spindle ... W6
- ½" cap., 15" swing, 3 spindle ... B33
- ½" cap., 15" swing, 3 spindle ... F1
- ½" cap., 15" swing, 3 spindle ... W6
- ½" cap., 15" swing, 4 spindle ... B33
- ½" cap., 15" swing, 4 spindle ... F1
- ½" cap., 15" swing, 4 spindle ... W6
- ½" cap., 15" swing, 6 spindle ... W6
- ½" cap., 14½" swing, 1, 2, 3, 4 spindles ... D20
- ½" cap., 16" swing ... C5
- ½" cap., 16" swing ... C11
- ½" cap., 16" swing, 2 spindle ... C11
- ½" cap., 16" swing, 3 spindle ... C11
- ½" cap., 16" swing, 4 spindle ... C11
- ½" cap., 16" swing, 5 spindle ... C11
- ½" cap., 16" swing, 6 spindle ... C11
- ½" cap., 17" swing ... D6
- ½" cap., 17" swing, 2 spindle ... D6
- ½" cap., 17" swing, 3 spindle ... D6
- ½" cap., 17" swing, 4 spindle ... D6
- ½" cap., 17" swing, 5 spindle ... D6
- ½" cap., 17" swing, 6 spindle ... D6
- ½" cap., 17" swing, 8 spindle ... D6
- ½" cap., 20" swing ... T4

DRILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Sensitive Floor and Pedestal

Round Column

(Continued)

½" cap., 18" swing, Hand Feed C54
½" cap., 18" swing, Power Feed C54
⅝" cap., 15" swing B33
⅝" cap., 15" swing, 2 spindle B33
⅝" cap., 15" swing, 3 spindle B33
⅝" cap., 15" swing, 4 spindle B33
⅝" cap., 20" swing T4
¾" cap., 18" swing, Hand Feed C54
¾" cap., 18" swing, Power Feed C54
⅜" cap., 18" swing C11
⅜" cap., 18" swing, 2 spindle C11
⅜" cap., 18" swing, 3 spindle C11
⅜" cap., 18" swing, 4 spindle C11
⅜" cap., 18" swing, 5 spindle C11
⅜" cap., 18" swing, 6 spindle C11
¾" cap., 20" swing C5
⅞" cap., 15" swing A25
⅞" cap., 16" swing B47
⅞" cap., 16" swing, 2 spindle B47
⅞" cap., 16" swing, 3 spindle B47
⅞" cap., 16" swing, 4 spindle B47
⅞" cap., 16" swing, 6 spindle B47
⅞" cap., 18" swing C11
⅞" cap., 18" swing, 2 spindle C11
⅞" cap., 18" swing, 3 spindle C11
⅞" cap., 18" swing, 4 spindle C11
⅞" cap., 18" swing, 5 spindle C11
⅞" cap., 18" swing, 6 spindle C11
⅞" cap., 20" swing S3
1" cap., 24" swing A25
1" cap., 24" swing B47
1" cap., 24" swing, 2 spindle B47
1" cap., 24" swing, 3 spindle B47
1" cap., 24" swing, 4 spindle B47
1" cap., 24" swing, 6 spindle B47
1" cap., 30" swing A25
1" cap., 30" swing B47
1" cap., 30" swing, 2 spindle B47
1" cap., 30" swing, 3 spindle B47
1" cap., 30" swing, 4 spindle B47
1" cap., 30" swing, 6 spindle B47
1" cap., 18" swing B47
1" cap., 18" swing C11
1" cap., 18" swing, 2 spindle C11
1" cap., 18" swing, 3 spindle C11
1" cap., 18" swing, 4 spindle C11
1" cap., 18" swing, 5 spindle C11
1" cap., 18" swing, 6 spindle C11
1" cap., 20" swing C5
1" cap., 20" swing W6
1" cap., 20" swing, 2 spindle W6
1" cap., 20" swing, 3 spindle W6
1" cap., 20" swing, 4 spindle W6
1" cap., 20" swing, 5 spindle W6
1" cap., 20" swing, 6 spindle W6
1" cap., 24" swing F13
1½" cap., 21" swing C5
1½" cap., 24" swing F13
21" swing B21
22" swing B21
No. 2 M.T., 15" swing A21
No. 2 Morris Taper D20
No. 3 M.T., 18" swing, Hand Feed C54
No. 3 M.T., 18" swing, Power Feed C54
2 spindle A21
3 spindle A21
4 spindle A21
1 hp M2

Upright Type

Box Column

1" to 1¼" drill cap., 12" head travel O1
1½" drill cap., 12" head travel O1
2" drill cap., 12" head travel O1
2" to 3" drill cap., 12" head travel O1
20" swing, Drilling and Tapping Machine.. B8
20" swing, 2 spindle, Drilling and Tapping Machine B8
20" swing, 3 spindle, Drilling and Tapping Machine B8
20" swing, 4 spindle, Drilling and Tapping Machine B8
20" swing, 5 spindle, Drilling and Tapping Machine B8
20" swing, 6 spindle, Drilling and Tapping Machine B8
21" swing, 1½" drill cap., ... C11
21" swing, 1½" cap. F13
21" swing C8
21" swing, Gang Drills 2 to 6 spindles ... C8
22" swing, Drilling and Tapping Machine.. B8
22" swing, 2 spindle, Drilling and Tapping Machine B8
22" swing, 3 spindle, Drilling and Tapping Machine B8
22" swing, 4 spindle, Drilling and Tapping Machine B8
22" swing, 5 spindle, Drilling and Tapping Machine B8
22" swing, 6 spindle, Drilling and Tapping Machine B8
24" swing A25
24" swing C8
24" swing, Drilling and Tapping Machine.. B8
24" swing W16
24" swing, 2 spindle A25
24" swing, 2 spindle, Drilling and Tapping Machine B8
24" swing, 2 spindle W16
24" swing, 3 spindle A25
24" swing, 3 spindle, Drilling and Tapping Machine B8
24" swing, 3 spindle W16
24" swing, 4 spindle A25
24" swing, 4 spindle, Drilling and Tapping Machine B8
24" swing, 5 spindle, Drilling and Tapping Machine B8
24" swing, 6 spindle A25
24" swing, 6 spindle, Drilling and Tapping Machine B8
24" swing, Gang Drills 2 to 6 spindles ... C8
24½" swing, 2" dia., 2 spindle F9
24½" swing, 2" dia., 3 spindle F9
24½" swing, 2" dia., 4 spindle F9
24½" swing, 2" dia., 5 spindle F9
24½" swing, 2" dia., 6 spindle F9
24½" swing, 2" dia., 7 spindle F9
24½" swing, 2" dia., 8 spindle F9
25" swing, 2" cap. F13
26" swing, Drilling and Tapping Machine, Sliding Head B8
26" swing, 2 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 3 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 4 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 5 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 6 spindle, Drilling and Tapping Machine, Sliding Head B8
28" swing C8
28" swing, 2 to 6 spindles, Gang Drills.. C8
30" swing, 3, 5, and 7½ hp C18
30" swing, 2½" cap. F13
32" swing, 3" dia., 2 spindle F9
32" swing, 3" dia., 3 spindle F9
32" swing, 3" dia., 4 spindle F9
32" swing, 3" dia., 5 spindle F9
32" swing, 3" dia., 6 spindle F9
32" swing, 3" dia., 7 spindle F9
32" swing, 3" dia., 8 spindle F9
25" swing, 3, 5 and 7½ hp C18
10 hp L17
25 hp L17

Round Column

20" swing, Drilling and Tapping Machine B8
20" swing, 1½" cap. C5
20" swing, 2 spindle, Drilling and Tapping Machine B8
20" swing, 3 spindle, Drilling and Tapping Machine B8
20" swing, 4 spindle, Drilling and Tapping Machine B8
20" swing, 5 spindle, Drilling and Tapping Machine B8
20" swing, 6 spindle, Drilling and Tapping Machine B8
20¼" swing, 1¼" cap. S12
20¼" swing, 1¼" cap., Pedestal Type, 2 Spindle S12
21" swing, 1½" cap., Standard, "Back Geared" B47
21" swing, 1½" cap. C5
21" swing C8
21" swing, 1½" drill cap. C11
21" swing, 1½" cap. F13
22" swing, Drilling and Tapping Machine. B8
22" swing, 1¼" cap. B47
22" swing, 2 spindle, Drilling and Tapping Machine B8
22" swing, 2 spindle, 1¼" cap. B47
22" swing, 3 spindle, Drilling and Tapping Machine B8
22" swing, 3 spindle, 1¼" cap. B47
22" swing, 4 spindle, Drilling and Tapping Machine B8
22" swing, 4 spindle, 1¼" cap. B47
22" swing, 5 spindle, Drilling and Tapping Machine B8
22" swing, 6 spindle, Drilling and Tapping Machine B8
22" swing, 6 spindle, 1¼" cap. B47
24" swing, 1½" cap. C5
24" swing C8
24" swing, Drilling and Tapping Machine. B8
24" swing, 2 spindle, Drilling and Tapping Machine B8
24" swing, 3 spindle, Drilling and Tapping Machine B8
24" swing, 4 spindle, Drilling and Tapping Machine B8
24" swing, 5 spindle, Drilling and Tapping Machine B8
24" swing, 6 spindle, Drilling and Tapping Machine B8
24¼" swing, 1¼" cap. S12
25" swing, 3, 5 and 7½ hp C18
25" swing, ¾" cap. S12
25" swing, ¾" cap., Pedestal-Type, 3 Spindle S12
25" swing, 2" cap. F13
26" swing, Drilling and Tapping Machine, Sliding Head B8
26" swing, 2 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 3 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 4 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 5 spindle, Drilling and Tapping Machine, Sliding Head B8
26" swing, 6 spindle, Drilling and Tapping Machine, Sliding Head B8
28" swing C8
29" swing, 1¾" cap. S12
30" swing, 3, 5, and 7½ hp C18
30" swing, 2½" cap. F13
1 hp M2

Heavy Manufacturing

13" swing, Hydraulic Feed, adapt for multi-spindle B2
14½" swing, ½" chuck S25
18" swing, Hydraulic Feed, adapt for multi-spindle B2
20" swing, Hydraulic Feed B2
20" swing, Drilling and Tapping Machine, Single Purpose B8
20" swing, 2 spindle, Drilling and Tapping Machine, Single Purpose B8
20" swing, 3 spindle, Drilling and Tapping Machine, Single Purpose B8
20" swing, 4 spindle, Drilling and Tapping Machine, Single Purpose B8
20" swing, 5 spindle, Drilling and Tapping Machine, Single Purpose B8
20" swing, 6 spindle, Drilling and Tapping Machine, Single Purpose B8
21" swing, Drilling and Tapping Machine, Single Purpose B8
21" swing, 1½" drill cap., Stationary Head C11
21" swing, 2 spindle, Drilling and Tapping Machine, Single Purpose B8
21" swing, 3 spindle, Drilling and Tapping Machine, Single Purpose B8
21" swing, 4 spindle, Drilling and Tapping Machine, Single Purpose B8
21" swing, 5 spindle, Drilling and Tapping Machine, Single Purpose B8
21" swing, 6 spindle, Drilling and Tapping Machine, Single Purpose B8
22" swing, Single Purpose B2
22" swing, Universal, quick change B2
22" swing, Drilling and Tapping Machine, Hydraulic B8
24" swing, Drilling and Tapping Machine, Hydraulic B8
24" swing, Universal, quick change B2
24½" swing, Single Purpose B2
25" swing, Single Purpose B2
32" swing, Drilling and Tapping Machine, Hydraulic B8
Special B9
1½" to 3" cap., Single Spindle and Gangs C26
Special, Multiple Spindle B9
Special, Comb. Drilling and Tapping B9

DRILLING MACHINES

(Code number following each listing indicates manufacturer. key on page 92)

Radial

Plain

½" cap. 24" reach
Nonferrous ... 04
½" cap. 114" reach
Nonferrous ... 04
36" swing. Sensitive ... F13
18" swing. Sensitive ... F13
3' arm. 7" col. 1" drill cap. ... C11
3' arm. 9" column ... A17
3' arm. 9" column ... C1
3' arm. 9" column ... C8
3' arm. 9" column ... C10
3' arm. 9" column ... M35
3' arm. 11" column ... A17
3' arm. 11" column ... C1
3' arm. 11" column ... C8
3' arm. 11" column ... C10
3' arm. 11" column ... F13
3' arm. 11" column ... M35
3' arm. 13" column. Box Column ... W16
3' arm. 14" column. Box Column ... W16
3½' arm. 13" column. Box Column ... W16
3½' arm. 14" column. Box Column ... W16
4' arm. 9" column ... A17
4' arm. 9" column ... C1
4' arm. 9" column ... C8
4' arm. 9" column ... C10
4' arm. 9" column ... M35
4' arm. 11" column ... A17
4' arm. 11" column ... C1
4' arm. 11" column ... C8
4' arm. 11" column ... C10
4' arm. 11" column ... F13
4' arm. 11" column ... M35
4' arm. 13" column ... A17
4' arm. 13" column ... C1
4' arm. 13" column ... C8
4' arm. 13" column ... F13
4' arm. 13" column. Box Column ... W16
4' arm. 14" column. Box Column ... W16
4½' arm. 11" column ... A17
5' arm. 11" column ... C1
5' arm. 11" column ... C8
5' arm. 11" column ... C10
5' arm. 11" column ... F13
5' arm. 11" column ... M35
5' arm. 13" column ... A17
5' arm. 13" column ... C1
5' arm. 13" column ... C8
5' arm. 13" column ... F13
5' arm. 13" column. Box Column ... W16
5' arm. 15" column ... A17
5' arm. 15" column ... C1
5' arm. 15" column ... C8
5' arm. 15" column ... F13
5' arm. 16" column. Box Column ... W16
5' arm. 17" column ... A17
5' arm. 17" column ... C1
5' arm. 17" column ... C8
5' arm. 17" column ... F13
5' arm. 18" column. Box Column ... W16
5' arm. 20" column. Box Column ... W16
6' arm. 11" column ... A17
6' arm. 11" column ... C1
6' arm. 11" column ... C8
6' arm. 11" column ... C10
6' arm. 11" column ... F13
6' arm. 11" column ... M35
6' arm. 13" column ... A17
6' arm. 13" column ... C1
6' arm. 13" column ... C8
6' arm. 13" column ... F13
6' arm. 13" column. Box Column ... W16
6' arm. 15" column ... A17
6' arm. 15" column ... C1
6' arm. 15" column ... C8
6' arm. 15" column ... F13
6' arm. 17" column ... A17
6' arm. 17" column ... C1
6' arm. 17" column ... C8
6' arm. 17" column ... F13
6' arm. 18" column. Box Column ... W16
6' arm. 19" column ... C1
6' arm. 19" column ... C8
6' arm. 19" column ... F13
6' arm. 20" column. Box Column ... W16
6' arm. 22" column. Box Column ... W16
7' arm. 17" column ... A17
7' arm. 17" column ... C1
7' arm. 17" column ... C8
7' arm. 19" column ... C1
7' arm. 19" column ... C8
7' arm. 19" column ... F13
7' arm. 20" column. Box Column ... W16
7' arm. 22" column ... C1
7' arm. 22" column ... C8
7' arm. 22" column. Box Column ... W16
8' arm. 19" column ... C1
8' arm. 19" column ... C8
8' arm. 19" column ... F13
8' arm. 22" column ... C1
8' arm. 22" column ... C8
8' arm. 22" column. Box Column ... W16
8' arm. 26" column ... C1
9' arm. 22" column ... C1
9' arm. 22" column ... C8
9' arm. 26" column ... C1
10' arm. 22" column ... C1
10' arm. 26" column ... C1
10' arm. 26" column ... C8
11' arm. 26" column ... C1
11' arm. 26" column ... C8
12' arm. 26" column ... C1
12' arm. 26" column ... C8

Universal

5' arm. ⅛" dia. drill. Jack Knife. Electric ... C7
5' arm. ¼" dia. drill. Jack Knife. Electric ... C7
6' arm. 14" column ... K3
6' arm. ¼" dia. drill. Jack Knife. Electric ... C7
6' arm. ⅜" dia. drill. Jack Knife. Electric ... C7
8' arm. 22" column ... K3
9' arm. 22" column ... K3
10' arm. 22" column ... K3

Sensitive Bench

24" x 40" base. 14" x 40" platen. Radial and Tee Flipper ... M33
31" swing ... W6

Sensitive Floor

30" swing ... E5
70" swing ... E5
100" swing ... F9

Traversing

½" drill cap. 36" width ... W1

Wall

6' to 20' arm. Power raising & lowering ... C25

Multiple Spindle Drilling Machines Not Eisewhere Classified

6" stroke ... R12
16" work dia ... Z1
24" work dia ... Z1
32" work dia ... Z1
40" work dia ... Z1
11½" swing. ½" chuck. 2 spindle ... S23
2 spindle ... R12
11½" swing. ½" chuck. 3 spindle ... S23
3 spindle ... S23
4 spindle ... S23
11½" swing. ½" chuck. 4 spindle ... S25
4 spindle. Automatic ... R5
4 spindle. Vertical. Unit Head Type ... R6
5 spindle ... S23
6 spindle ... S23
6 spindle. 10" x 16" or 12" circular drilling area. Table Feed. Univ. Joint Type ... M31
6 spindle. 3" cc end spindles. Table Feed. Straight Line. Rail Type ... M31
7 spindle. Fixed Center ... R5
8 spindle. Vertical Continuous ... I5
8 spindle. 3" cc end spindles. Table Feed. Straight Line. Rail Type ... M31
8 spindle. 4" cc end spindles. Table Feed. Straight Line. Rail Type ... M31
8 spindle. 4" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
8 spindle. 4" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
8 spindle. 6" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
8 spindle. 6" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
8 spindle. 8" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
8 spindle. 8" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
8 spindle. 10" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
8 spindle. 10" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
8 spindle. 12" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
8 spindle. 12" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
10 spindle 3" cc end spindles. Rail Feed. Straight Line ... M31
10 spindle 4" cc end spindles. Rail Feed. Straight Line ... M31
10 spindle. 6" cc end spindles. Table Feed. Straight Line Type ... M31
10 spindle. 8" cc end spindles. Table Feed. Straight Line Type ... M31
10 spindle. 10" cc end spindles. Table Feed. Straight Line Type ... M31
10 spindle. 12" cc end spindles. Table Feed. Straight Line Type ... M31
12 spindle. Vertical Continuous ... I5
12 spindle. 4" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
12 spindle. 4" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
12 spindle. 8" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
12 spindle. 8" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
12 spindle. 8" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
12 spindle. 10" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
12 spindle. 12" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
12 spindle. 12" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
12 spindle. 12" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
14 spindle. 4" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
14 spindle. 4" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
14 spindle. 6" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
14 spindle. 6" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
14 spindle. 8" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
14 spindle. 8" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
14 spindle. 10" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
14 spindle. 10" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
14 spindle. 12" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
14 spindle. 12" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 2" x 4' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 2" x 6' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 2" x 8' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 2" x 10' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 2" x 12' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 7" x 4' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 7" x 6' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 7" x 8' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 7" x 10' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 7" x 12' drilling area. Rail Feed. Univ. Joint Type ... M31
15 spindle. 4" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
15 spindle. 4" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 4" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
15 spindle. 6" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
15 spindle. 6" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 6" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
15 spindle. 8" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
15 spindle. 8" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 8" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
15 spindle. 10" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
15 spindle. 10" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 10" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
15 spindle. 12" cc end spindles. Rail Feed. Straight Line. Table Type ... M31
15 spindle. 12" cc end spindles. Rail Feed. Straight Line. Floor Type ... M31
15 spindle. 12" cc end spindles. Rail Feed. Face Plate. Straight Line ... M31
16 spindle. 18" stroke ... B12
16 spindle. 18" x 36" drilling area. Rail Feed. Univ. Joint Type ... M31
16 spindle. 20" circular drilling area. Rail Feed. Univ. Joint Type ... M31
16 spindle. 20" x 10' drilling area. Rail Feed. Univ. Joint Type ... M31
16 spindle. 25" circular drilling area. Rail Feed. Univ. Joint Type ... M31
16 spindle. 12" x 6' drilling area. Table Feed. Univ. Joint Type ... M31

DRILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 521)

Drilling Machines Not Elsewhere Classified

Multiple Spindle Drilling Machines Not Elsewhere Classified

(Continued)

16 spindle, 12" x 8' drilling area, Table Feed, Univ. Joint Type ... M31
16 spindle, 12" x 10' drilling area, Table Feed, Univ. Joint Type ... M31
16 spindle, 12" x 12' drilling area, Table Feed, Univ. Joint Type ... M31
16 spindle, 3' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 4' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 4' cc end spindles, Rail Feed, Straight Line, Floor Type ... M31
16 spindle, 6' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 6' cc end spindles, Rail Feed, Straight Line, Floor Type ... M31
16 spindle, 6' cc end spindles, Table Feed, Straight Line ... M31
16 spindle, 8' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 8' cc end spindles, Rail Feed, Straight Line, Floor Type ... M31
16 spindle, 8' cc end spindles, Table Feed, Straight Line ... M31
16 spindle, 10' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 10' cc end spindles, Rail Feed, Straight Line, Floor Type ... M31
16 spindle, 10' cc end spindles, Table Feed, Straight Line ... M31
16 spindle, 12' cc end spindles, Rail Feed, Straight Line, Table Type ... M31
16 spindle, 12' cc end spindles, Rail Feed, Straight Line, Floor Type ... M31
16 spindle, 12' cc end spindles, Table Feed, Straight Line ... M31
33 spindle ... S23
34 spindle ... S23
50 spindle, 18" stroke ... B12
4 station, Automatic Indexing ... R5
5 station ... S23
1 hp ... M2
5 hp ... F14
7½ max. hp, Vertical ... M20
10 hp ... F14
15 hp ... F14
15 max. hp, Vertical ... M20
20 hp ... F14
25 max. hp, Vertical ... M20
30 hp ... F14
40 hp ... B12
50 hp ... F14
50 max. hp, Vertical ... M20
One way, Horizontal, Hydraulic ... B2
Two Way, Horizontal, Hydraulic ... B2
Three Way, Horizontal, Hydraulic ... B2
Special, High-production, single purpose, way type ... B48
Special, Vertical ... C36
Special, Fixed Center ... F9
Special ... M2
Special ... M20

Automatic

Center Column

12 station ... S23
Special, Index Station ... B9
Special ... L17
Special, Index ... S23
Special, Continuous ... B9
Special ... L12
Special, Drilling, Tapping ... K11

Turret-Index Station

4 spindle, Drilling, Tapping Automatic Dial Type ... B31
4 station, Indexing Machine, Horiz. ... D5
6 spindle, Drilling, Tapping Automatic Dial Type ... B31
6 station, ½" drill, Drilling & Tapping, Turret Type Indexing ... B53
6 station, Indexing Machine, Vertical ... D5
8 spindle, Drilling, Tapping Automatic Dial Type ... B31
8 station, 1¼" drill, Drilling & Tapping, Turret Type Indexing ... B53
7" max. cap., Drilling, Burring, Milling ... D5
Special ... B9
Special, Automatic Drilling and Tapping ... H10
Special, Drilling, Tapping ... K11
Special ... K14
Special ... L12

Unit Head and Way

Vertical

3" spindle, No. 5 M.T. ... M31
6 spindle, 1 head, Spot Facing ... L17
10 spindle, 1 head ... L17
2 unit, Drilling, Reaming and Tapping ... B36
5 unit, Drilling, Reaming and Tapping ... B36
1 hp ... M2
1½ hp ... F14
1½ hp, Vertical or Horizontal ... F14
3 hp, Vertical or Horizontal ... F14
7½ hp ... F14
7½ hp, Vertical or Horizontal ... F14
2 head, Automatic Indexing ... R5
3 head, Unit Head Type ... R5
4 head, Unit Head Type, Automatic Indexing ... R5
6 head, Unit Head Type, Automatic Indexing ... R2
Special ... B9
Special, Drilling, Tapping ... K11
Special ... K14

Horizontal

1 spindle, 20 hp, Single End ... M31
2 or 3 spindle, 1 unit, Railroad Track ... M31
Special ... K14
½" capacity ... A25
⅝" capacity ... A25
5½" to 10" bolt circle ... L17
2 unit, Drilling, Reaming and Tapping ... B36
3 unit, Drilling, Reaming and Tapping ... B36
2 head, Unit Head Type ... R2
2 head, Unit Head Type, Automatic Indexing ... R5
4 head, Way Type, Automatic Indexing ... R5
6 head, Unit Head Type ... R5
9 head, Unit Head Type ... R5
2 ways, Unit Head Type ... R5
2 ways, Way Type, Automatic Indexing ... R5
4 ways, Way Type, Hand Indexing ... R5
1 hp ... M2
Special ... B9
Special ... K14
Special, Drilling, Tapping ... L11
Special ... L17

Combination Vertical & Horizontal

4 unit, Drilling, Reaming and Tapping Unit Head ... B36
4 head, Unit Head Type Indexing ... R5
6 head, Unit Head Type, Automatic Indexing ... R5
6 way, Way Type, Automatic Indexing ... R5
1 hp ... M2
Special ... B9
Special ... K11
Special ... L17
Special, Drilling, Tapping ... K11

Angular

½" drill ... H25
½" steel, 3" stroke ... H25
5 unit, Drilling, Reaming and Tapping ... B36
2 way, Way Type, Automatic Indexing ... R5
6 way, Way Type, Hand Indexing ... R5
4 head, Unit Head Type, Hand Indexing ... R5
6 head, Unit Head Type, Automatic Indexing ... R5
6 head, Unit Head Type, Automatic Clamping and Ejecting ... R5
1 hp ... M2
Special ... B9
Special ... K14
Special ... L17
Special, Drilling, Tapping ... K11

Deep Hole Drilling

Horizontal

⅛" to ⅝" hole, 10" depth, 2 spindle ... P17
⅛" to ⅝" hole, 30" depth, 2 spindle ... P17
⅛" to ⅝" hole, 50" depth, 2 spindle ... P17
½" capacity ... A25
½" to 1" hole, 50" depth, 2 spindle ... P17
½" to 1" hole, 74" depth, 2 spindle ... P17
½" to 1" hole, 98" depth, 2 spindle ... P17
1" capacity ... A25
1" to 2" hole, 37" depth, 2 spindle ... P17
1" to 2" hole, 61" depth, 2 spindle ... P17
1" to 2" hole, 81" depth, 2 spindle ... P17
1" to 2" hole, 105" depth, 2 spindle ... P17
1" to 2" hole, 129" depth, 2 spindle ... P17
1 station ... D5
2 spindle, Double End ... B12
Special ... B9
Special ... C36
Special ... K14

Vertical

⅛" to ⅝" hole, 14" depth, 6 spindle ... P17
Special ... B9
Special ... K14

Other Drilling Machines

Horizontal

4" spindle, box column, Horizontal Traversing ... K3
9" swing, ⅞" drill ... F19
14" swing, 1½" drill ... F19
14" column, 2½" spindle, Horizontal Traversing ... K3
16" column, 3" spindle, Horizontal Traversing ... K3
3 station ... D5
16 station ... D5
24 station ... D5
1 hp ... M2
¾" dia., 2 spindle ... K2
Special, Floor Type ... N2

Others

½" cap., 8" swing, Post Type ... C5
½" cap., 12" swing, Post Type ... C5
⅝" cap., 12" swing, Post Type ... C5
¾" cap., 12" swing, Post Type ... C5
1" max. cap., Drilling and Burring ... D5
1" cap., 12" swing, Post Type ... C5
1¼" dia., Back Spot Facing ... T2
1¼" cap., 14" swing, Post Type ... C5
1¼" cap., 14½" swing, Post Type ... C5
1¼" cap., 15" swing, Post Type ... C5
1¼" cap., 16" swing, Post Type ... C5
1¼" cap., 17" swing, Post Type ... C5
1½" cap., 15" swing, Post Type ... C5
1½" cap., 18" swing, Post Type ... C5
1½" cap., 20" swing, Post Type ... C5
1½" cap., 21" swing, Post Type ... C5
1½" cap., 24" swing, Post Type ... C5
3 to 5 hp each head, Two Way, Angular ... B12
3 to 10 hp each head, Two Way, Combination ... B12
5" dia., 8" long, Oil Groover, Horizontal ... F6
6" dia., column, 2" traverse on base, Horizontal Spindle, Vertical Column, portable ... C5
12" swing, Inverted Type, Heavy Duty, Hyd. Feed, 2 spindle (13" centers) ... B2
15" dia., 15" long, Oil Groover, Horizontal, Horizontal ... F6
17" swing, Drilling Machine, Precision, Fixed Spindle Location, Spacing Table ... C5
10 spindle, Drilling, Reaming & Tapping Automotive Connecting Rods ... M31
9 spindle, Three Way, Angular ... B12
Rack, Spot Facing ... B47
Special, Layout Drilling Machine ... C18
Special, Rail Drilling ... C36

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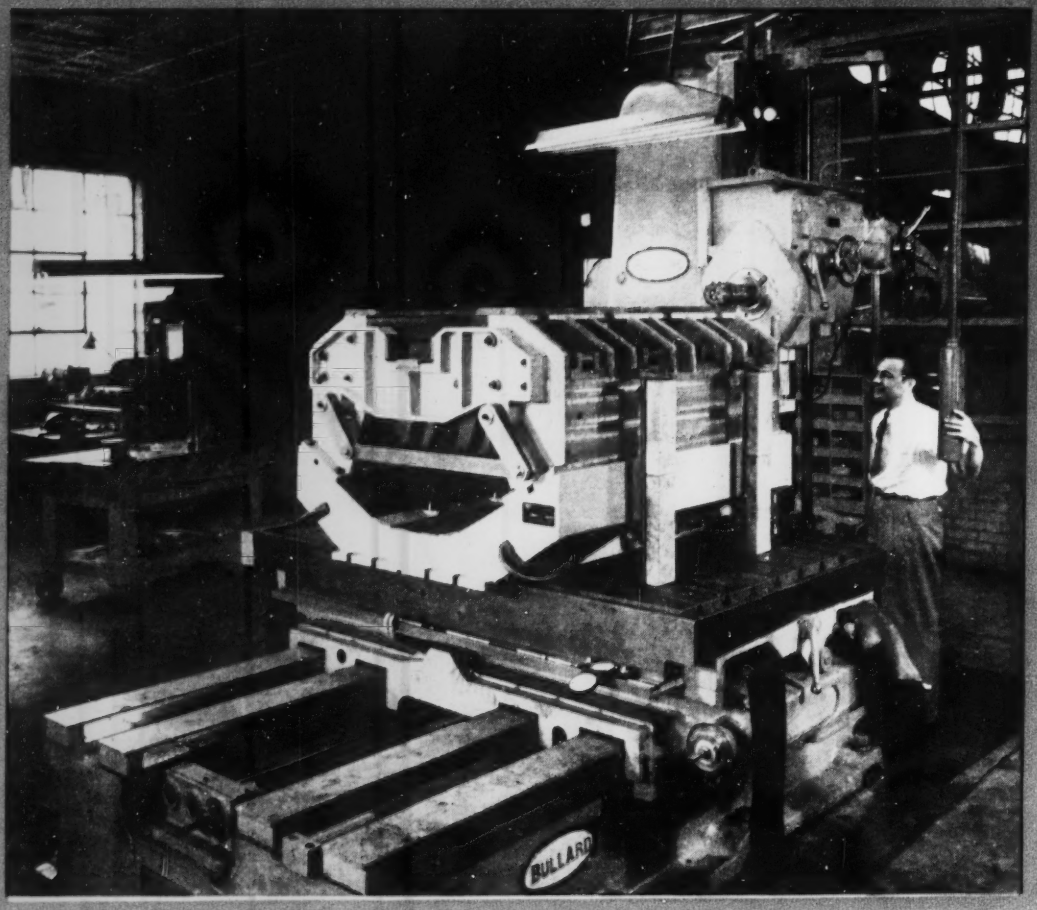

To Make Light Work Of Tough Jobs

A massive machine, The 4-Way Bed Bullard 4" and 5" Spindle Horizontal Boring, Milling and Drilling Machine, assures greater productivity. Sturdy box type saddles and tables, anti-friction extension bar support in the heavier rear post, the motor driven lubrication pump for the gear boxes, hydro-dynamic coupling and main drive with brake motor are some of the features embodied in this machine to maintain a higher degree of accuracy and efficiency.

The versatility and reliability of Bullard Horizontal Boring, Milling and Drilling Machines have been well established in the metal working industry. Ask a Bullard representative to explain its many other features or write to:

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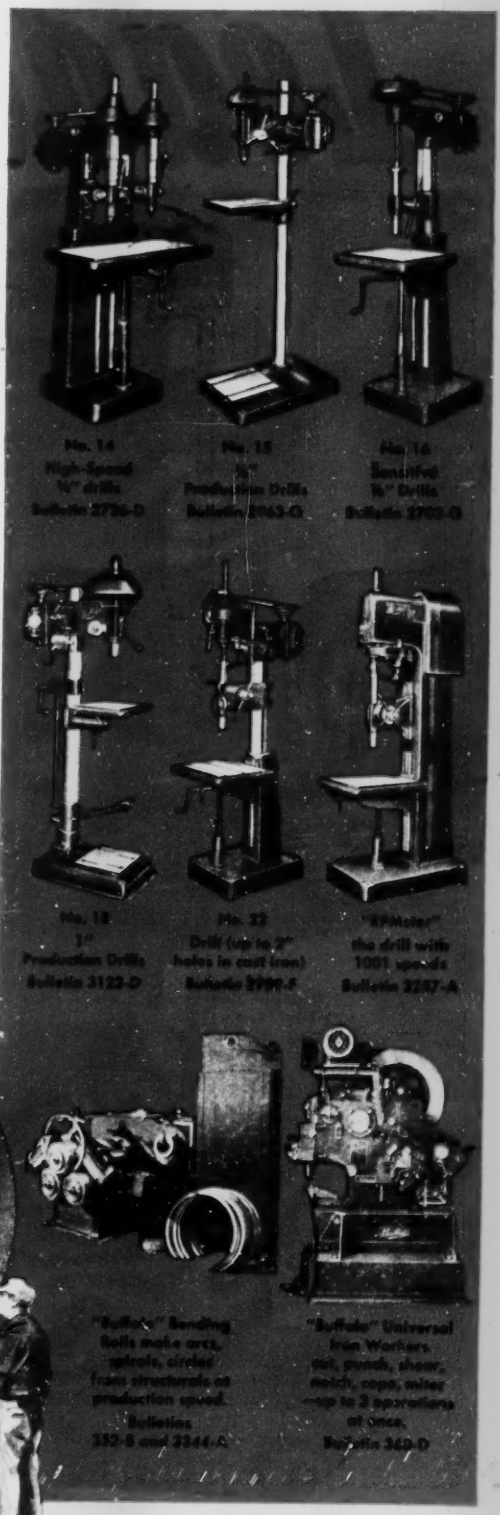

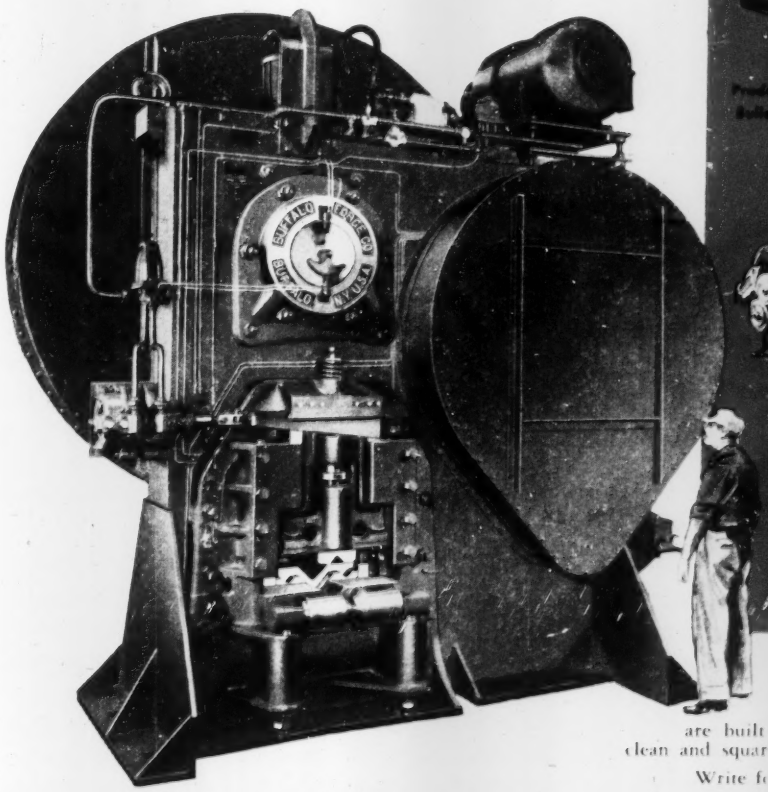

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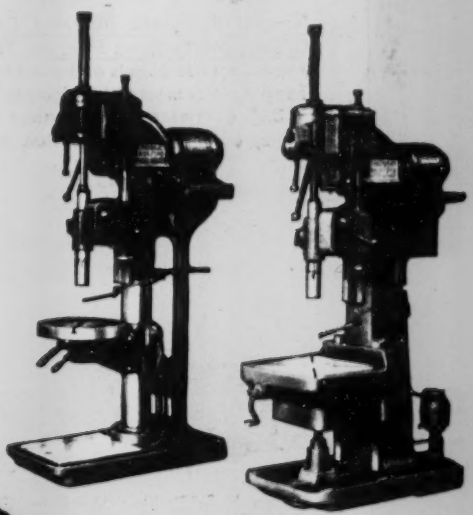
The pioneering and development of the all-speed head, constant power delivery to the spindle, and centralized controls at operator position make Cincinnati Bickford Super Service Radial Drills leaders in productivity and versatility today.

With eyes on tomorrow, Cincinnati Bickford looks ahead to new and continued developments.



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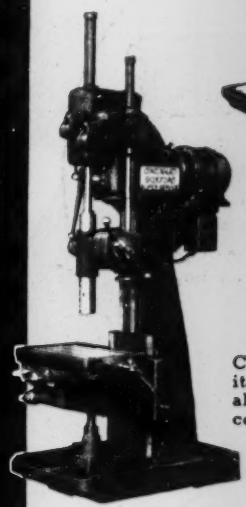
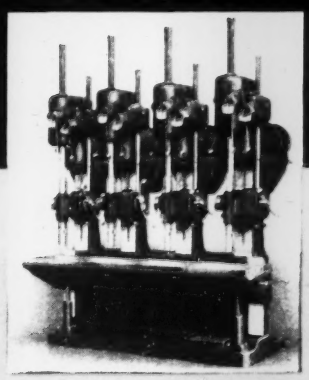
Built in 21", 24" and 28" sizes and with round or box column.



Compound table to facilitate layout work is available on 24" and 28" box column machines.



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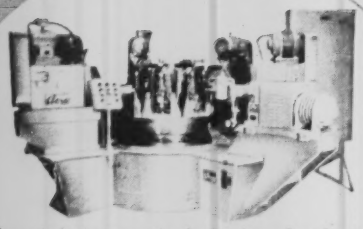
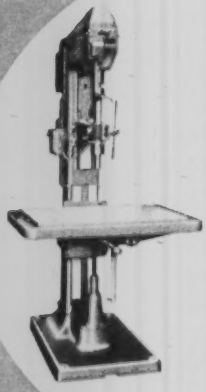
Cincinnati 9. Ohio U.S.A.



Special Automatic Indexing Production Drilling and Tapping Machine. Five No. 2 Avey Cam Feed Units and one Lead Screw Tapping Unit mounted horizontally around a 36" diameter, seven station indexing table, automatic, push button operation.

Deep Hole Drilling Machine. One Aveydraulic Deep Hole Drilling Unit, mounted on a sturdy fabricated steel base which contains the hydraulic power source and motor driven coolant system . . . torquematic withdrawal of drill . . . single or double end arrangement.



Standard sensitive and upright single or multiple spindle drilling and tapping machine . . . for holes up to 1½" diameter in Cast Iron. Complete with standard frame . . . reversing or non-reversing motor . . . hand or automatic feed.

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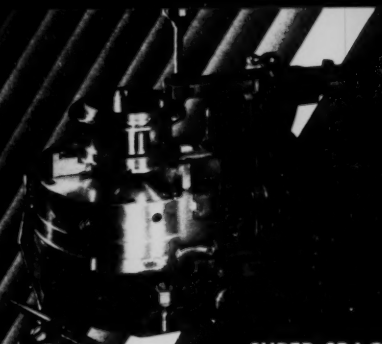

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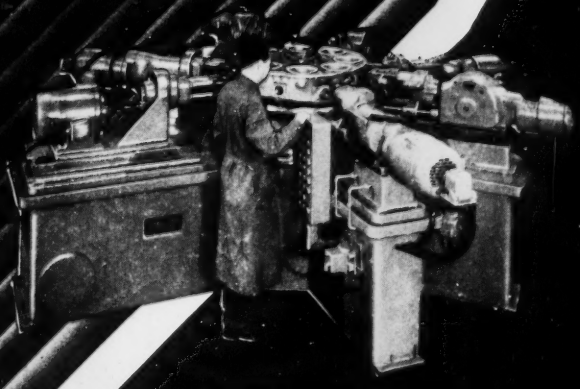

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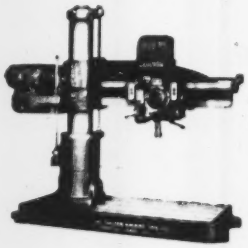
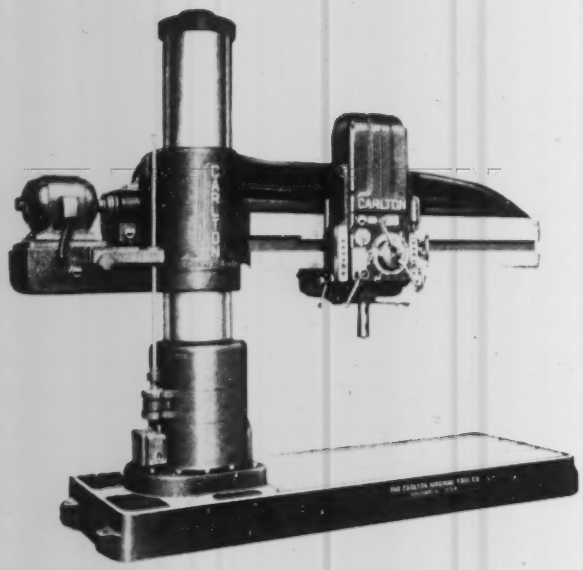
1A---- 9″ col. 3′-4′ arms
11″ col. 3′-4′-5′ arms





3A---- 13″ col. 4′-5′ arms
15″ col. 4′-5′-6′ arms
17″ col. 5′-6′-7′ arms

4A---- 19″ col. 6′-7′-8′ arms

5A---- 22″ col. 7′ to 10′ arms
26″ col. 8′ to 12′ arms

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Carlton's centralized pushbutton control, low-hung drive, 3-unit power clamping, all ball bearing construction, modern lubrication and Carlton's many other advantages assure maximum hole production for you. For prompt information on the Carlton Radial Drill you need, use coupon.

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CINCINNATI 25, OHIO, U.S.A.

THE CARLTON MACHINE TOOL CO.,
CINCINNATI 25, OHIO, U. S. A.

Gentlemen: Please send me at once and without obligation the Carlton Radial Drill bulletins checked below.

☐ 1A ☐ 3A
☐ 4A ☐ 5A

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

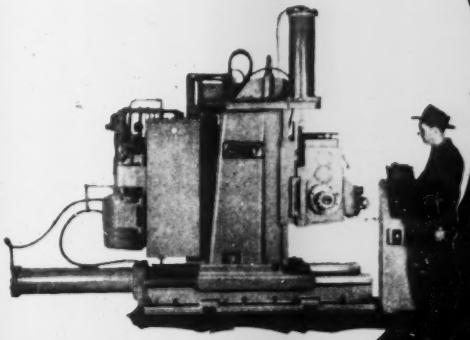
take

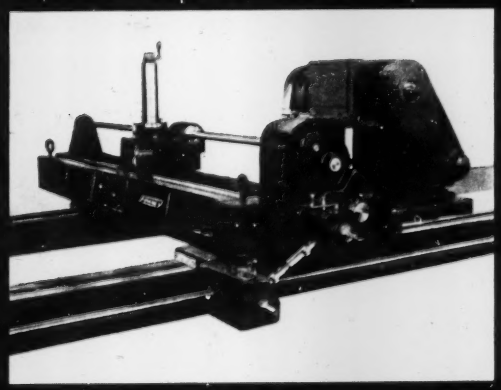
FORNEY

MACHINES TO YOUR JOBS

If you have milling or boring and facing jobs which are difficult or impossible to move you need Forney portable equipment. Forney, since 1916 a manufacturer of specially designed machinery, now offers both heavy duty portable milling machines and boring and facing machines which are easily, quickly and economically transported to the job.

Forney Boring and Facing machines may be installed as permanent units or used as portable equipment on jobs too large to move. The Forney machines handle anything from intricate profile milling up to 60 inch pipe flanges. Entire head of machine moves in and out giving extreme rigidity in cutting. Machine is designed to eliminate conventional overhang in bar travel. Weight of standard machine is 15,000 pounds. Work holding fixtures, tooling and floor plates available.





The Forney Milling Machine is ideal for milling all types of hammer bases, motor or Diesel engine bases or any other large surface which must remain stationary. The Forney machine can be quickly attached to the base top for fast and accurate machining of any surface at any angle with one setup. Head is designed to accommodate 3 to 15 inch diameter cutters which can be changed quickly and conveniently. Special design allows use of extra large cutters with no loss of rigidity. Weight of machine is approximately 4,000 pounds. Crane hooks provided for easy transportation.

• Write today for illustrated brochures on these two money, labor and time saving machines.

FORNEY'S, INC.

Manufacturers of Special Machinery Since 1916

P.O. BOX P310 NEW CASTLE, PA.

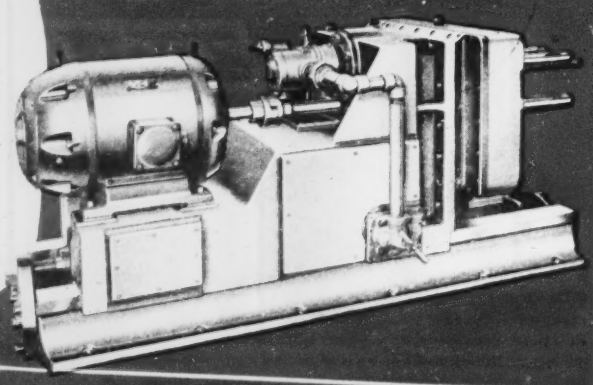
For Aircraft and Automotive Industries

BAUSH
POWER UNITS

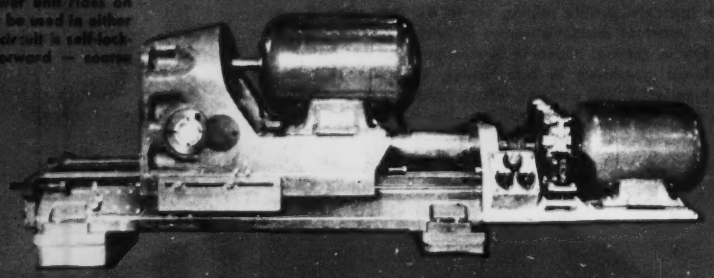
are available in

HYDRAULIC — ELECTRICAL and CAM TYPES

Readily adaptable as individual drives for Transfer Lineups, or for 2-way or 3-way automatic machine tools. BAUSH POWER DRIVES can be mounted vertically or horizontally and offer many practical features.

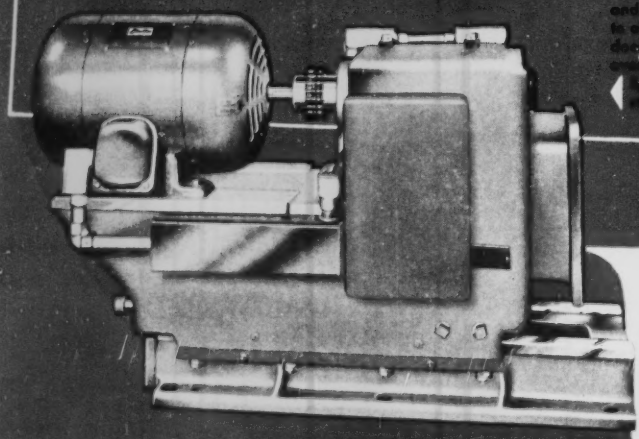


HYDRAULIC FEED POWER UNIT. Equipped with Vickers hydraulic controls and a self contained hydraulic system this BAUSH POWER UNIT assures dependable and efficient performance at all times. . . . Large mounting flange permits the mounting of multiple drill heads. Power unit rides on hardened and ground steel ways and may be used in either a vertical or horizontal position. Control circuit is self-locking and operation cycles are — rapid forward — coarse feed — fine feed — rapid return.



7.5 ELECTRICAL UNIT. This BAUSH POWER UNIT is for through tailstock on dovetail ways and is available in variable strokes of 12"—18"—24". This drive can be furnished with either single or multiple spindle fixed center head and is readily adapted to either drilling or tapping. . . . Maximum H.P. — 7½ at 1800 R.P.M. . . . Rapid travel forward and reverse at 480" per minute. . . . Feed Ranges 1" to 60" per minute.

CAM UNIT. Unexcelled for simplicity of operation on production work. One revolution of cylinder cam limit switch controls entire cycle of — rapid approach forward — feed (with dwell for facing, if desired) — rapid return and stop. . . . Complete within itself it can be mounted either vertically or horizontally and features an extremely flexible feed which can be governed to any rate by interchanging pick-off gears. Cam replacement does not require the complete dismantling of unit and an overload clutch prevents work damage and tool breakage. . . . Spindle speeds: 150 to 1250 R.P.M. . . . Model 1 has 6" stroke — Model 2 has 8" stroke



BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

Write, phone or wire today for complete technical data and specifications.

Unless your operators work for nothing...

The savings in time alone will pay for New

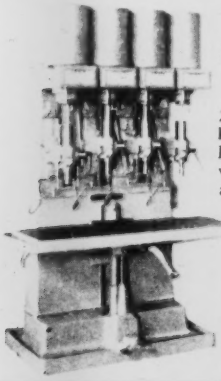
LELAND-GIFFORD DRILLING MACHINES

Convenient central controls, stepped-up speed, reduced work handling, built-in safeguards against costly errors, fast speed changes, quick adaptability to different jobs are some of the time-saving features of the new Leland-Gifford Drilling Machines which make it possible for the average operator to greatly increase machine production. And with the added advantage of higher precision, he can produce *better* work at the same time.

Leland-Gifford offers a complete line of motor spindle drilling machines — plus unsurpassed engineering skill and facilities for designing special tooling and adapting standard machines to meet any production drilling need. A Leland-Gifford field engineer can show you how to improve production and lower drilling costs with Leland-Gifford methods. Call the office near you.

No. 1LMS

Smallest holes up to 5/16"
Bench or floor types
One to Six Spindles
Speeds up to 10,800 RPM
12 or 20 inch Swing
Hand or Hydraulic Feed
Tapping by Friction
Tapping Attachment

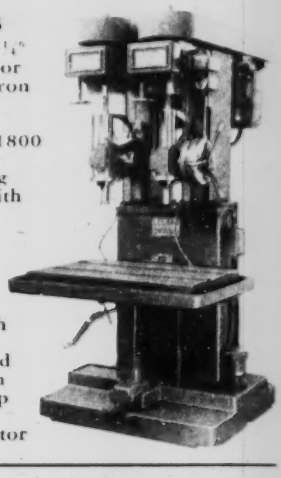


No. 2LMS

Holes from 1/16" to 1/4"
One to Six Spindles
Speeds up to 3600 RPM
20 or 26 inch Swing
Hand Feed;
Power Feed with three feed rates and Positive, Adjustable Depth Stop; or Hydraulic Feed — either plain or step-by-step.
Tapping by Reversing Motor or Friction Tapping Attachment

No. 3MVB

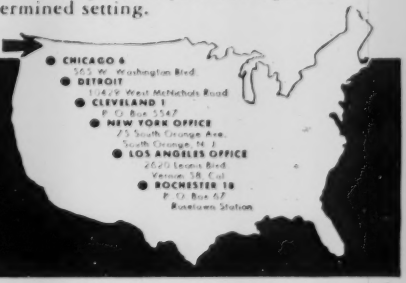
Holes up to 1 1/4" in Mild Steel or 1 1/2" in Cast Iron
One to Four Spindles
Speeds up to 1800 RPM
24 inch Swing
Power feed with three Rates, Adjustable Depth Stop and Safety Slip Clutch.
Also can be furnished with Hand Feed or Hydraulic Feed — either plain or step-by-step Tapping by Reversing Motor



HYDRAULIC FEED

Two types of hydraulic feed are available — the well-known step-by-step type for deep hole drilling; and a plain feed for shorter holes or reaming. With either type the feed-rate is *infinitely adjustable* and *independent*, and the maximum thrust pressure may be regulated with an overload release which withdraws the drill when the pressure exceeds a predetermined setting.

SAVE DAYS — CONTACT THE OFFICE NEAREST YOU

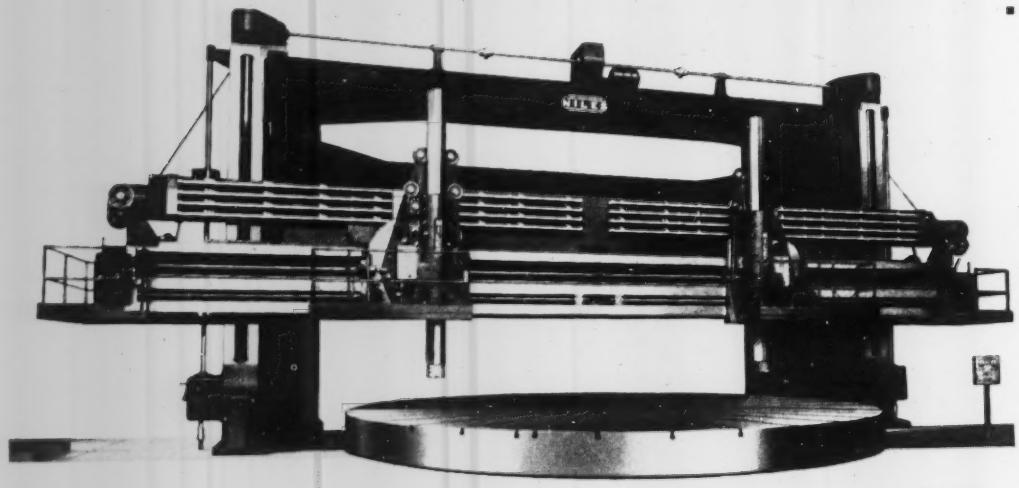


LELAND-GIFFORD
Drilling Machines

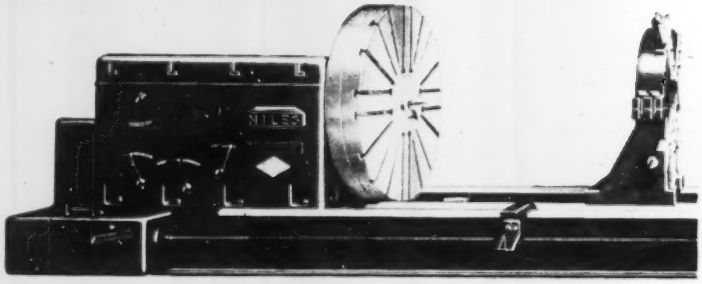
WORCESTER 1, MASSACHUSETTS, U. S. A.

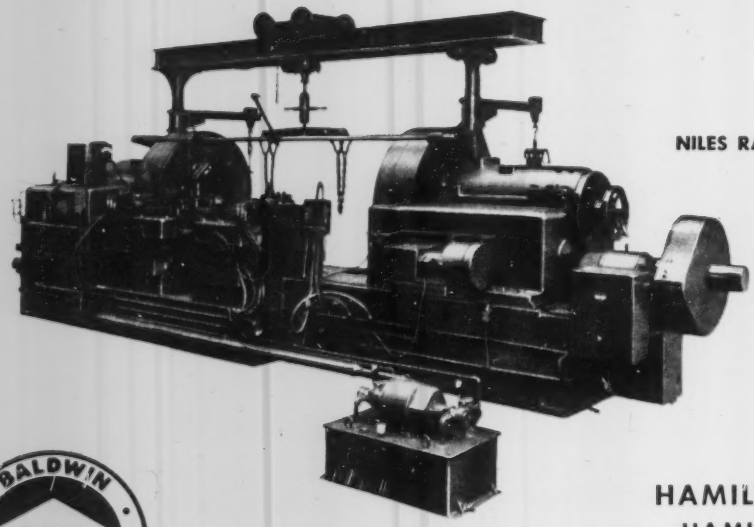
B-L-H MACHINE TOOLS

designed
. . . built



NILES VERTICAL BORING AND TURNING MILLS— 10' 12' 14' 16' 20' 30' and 43' *(shown above)*





NILES RAILROAD TOOLS— Hydraulic Car Wheel Lathe (at left); End Drive Axle Lathe; Hydraulic Centering Machine; Hydraulic Diesel and Car Wheel Borers; Hydraulic Axle Burnishing Lathe

BALDWIN BLH LIMA-HAMILTON

HAMILTON WORKS
HAMILTON, OHIO

BALDWIN - LIMA

for modern speeds and automation

ruggedly for lasting precision

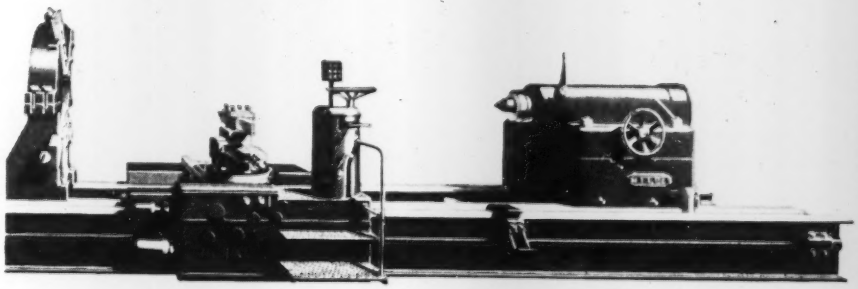
NILES

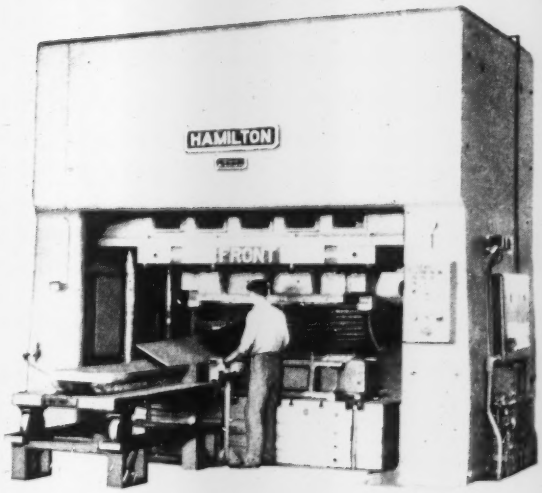
BORING MILLS
ENGINE LATHES
RAILROAD TOOLS

HAMILTON

MECHANICAL PRESSES

NILES HEAVY ENGINE LATHES—
40", 50", 60", 72", 84", 96" and larger sizes





HAMILTON MECHANICAL PRESSES—
single, double and triple action presses for metal forming and stamping; also open back inclinable presses, rail presses, welding presses and die fitting machines.

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Phone—Trinity 5-9154

WASHINGTON 5, D. C.
642 Wyatt Bldg.
Phone—Executive 3858

PITTSBURGH 19, PA.
643 Union Trust Bldg.
Phone—Atlantic 1-4896

NEW YORK 17, N. Y.
60 E. 42nd St.
Phone—MUrray Hill 2-4747

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Quinn & Quinn
1718-22 Comer Bldg.
Phone—4-5676

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Pratt & Whitney Div.
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Phone—LU 8187

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Overgard Machine Tool Co.
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Phone—Dearborn 25566

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Central States Machinery Co., Inc.
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Phone—Market 4491

NEW ORLEANS 12, LA.
Kelleher Engineering Corp.
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Phone—Tulane 0369

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The Robert E. Morris Co.
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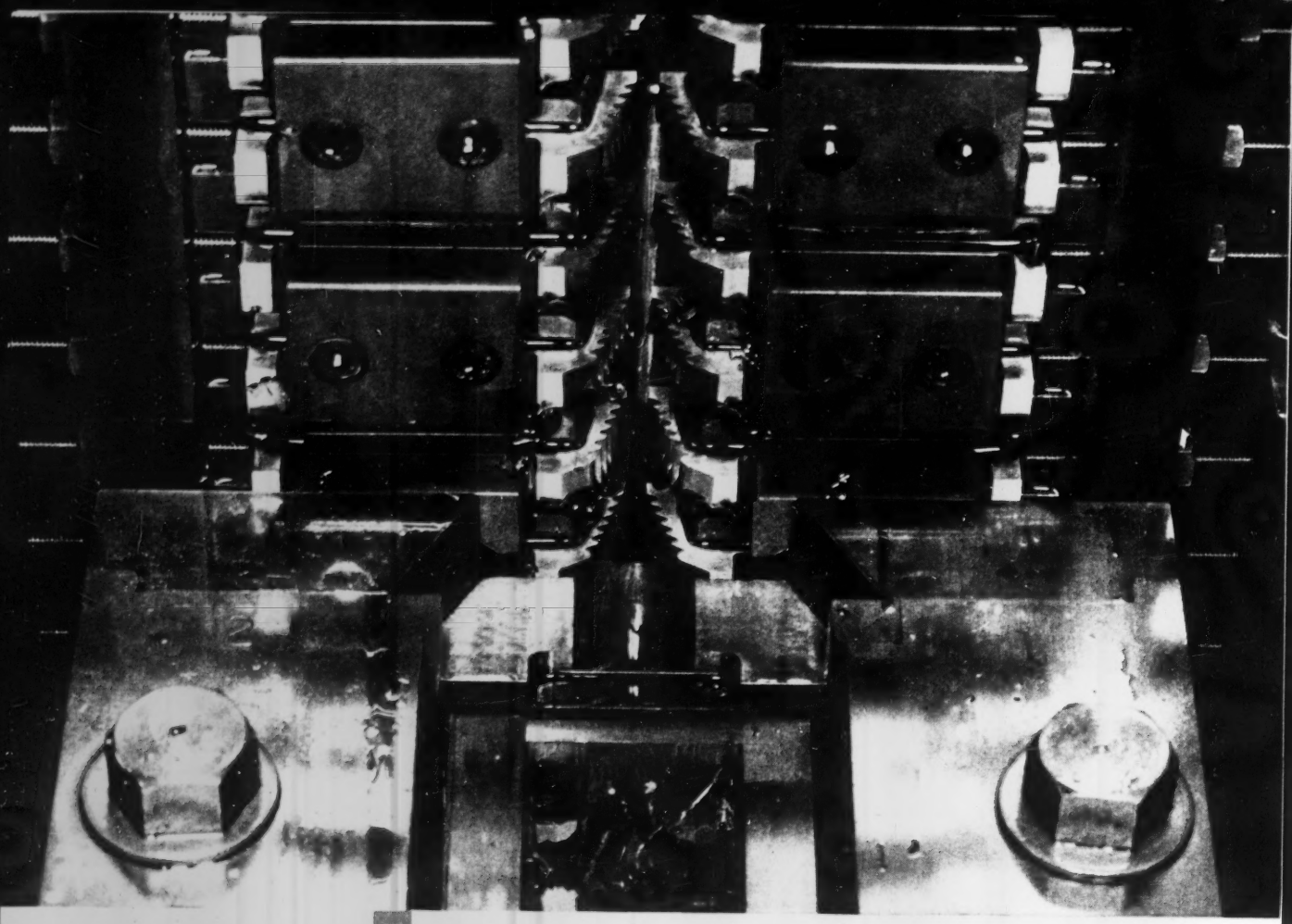
For full information on these B-L-H Machine Tools see our 12-page catalog in Sweet's Machine Tool Catalogs . . . or

Write **us for your free copy.**

- HAMILTON



MANUFACTURERS IN THIS SECTION

SECTION 2

Broaching Machines

American Broach & Machine Co.—A13
Cincinnati Milling Machine Inc.—C12
Colonial Broach Co.—C32
Foote-Burt Co.—F9
Fox Engineering Co.—F14
Lapointe Machine Tool Co.—L7
McPherson Broach & Machine Co.—M13
Zagar Tool Inc.—Z1

BROACHING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Horizontal, Internal and Combination Internal and Surface

Single Ram

2½ ton, 30" stroke — L7
3 ton, 20" stroke — Z1
4 ton, 24" stroke, Press Type — C32
5 ton, 20" stroke — Z1
6 ton, 24" stroke, Press Type — C32
6 ton, 36" stroke, Press Type — C32
6 ton, 54" stroke — C32
7 ton, 36" stroke — Z1
7½ ton, 32" stroke — L7
7½ ton, 48" stroke — L7
7½ ton, 52" stroke — L7
10 ton, 32" stroke — L7
10 ton, 36" stroke, Press Type — C32
10 ton, 48" stroke — L7
10 ton, 60" stroke — C32
10 ton, 60" stroke — L7
10 ton, 90" stroke — C32
15 ton, 66" stroke — L7
15 ton, 72" stroke — C32
15 ton, 90" stroke — C32
15 ton, 120" stroke — L7
15½ ton, 52" stroke — L7
20 ton, 72" stroke — L7
20½ ton, 64" stroke — L7
25 ton, 72" stroke — C32
25 ton, 90" stroke — C32
25 ton, 120" stroke — C32
26 ton, 64" stroke — L7
36½ ton, 68" stroke — L7
37½ ton, 72" stroke — L7
50 ton, 78" stroke — L7
75 ton, 90" stroke — L7

Electro-Mech. Drive
15 hp, 100" stroke — L7

Electro-Mech. Drive
15 hp, 120" stroke — L7

Electro-Mech. Drive
15 hp, 130" stroke — L7

Electro-Mech. Drive
15 hp, 180" stroke — L7

Special — M13

Twin Ram

15 ton, 66" stroke — L7
15 ton, 90" stroke — L7
15 ton, 120" stroke — L7
25 ton, 66" stroke — L7
25 ton, 90" stroke — L7
25 ton, 120" stroke — L7
Special — M13

Surface

2 ton, 30" stroke — A13
6 ton, 36" stroke — A13
6 ton, 48" stroke — A13
10 ton, 48" stroke — A13
10 ton, 66" stroke; One Way — C12
10 ton, 66" stroke; Two Way — C12
10 ton, 72" stroke; One Way — C12
10 ton, 72" stroke; Two Way — C12
15 ton, 66" stroke — A13
15 ton, 72" stroke; One Way — C12
15 ton, 72" stroke; Two Way — C12
15 ton, 84" stroke; One Way — C12
15 ton, 84" stroke; Two Way — C12
15 ton, 120" stroke — C32
20 ton, 66" stroke — A13
25 ton, 72" stroke; One Way — C12
25 ton, 72" stroke; Two Way — C12
25 ton, 84" stroke; One Way — C12
25 ton, 84" stroke; Two Way — C12
25 ton, 120" stroke — C32
30 ton, 72" stroke — A13
36" length broach — F9
60" length broach — F9
90" length broach — F9
110" length broach — F9
Special — M13

Vertical Internal Machines

Pull Down

4 ton, 12" stroke — L7
5 ton, 36" stroke — L7
6 ton, 18" stroke — L7
6 ton, 42" stroke — C32
6 ton, 54" stroke — C32
8 ton, 24" stroke — L7
10 ton, 24" stroke — L7
10 ton, 42" stroke — C32
10 ton, 42" stroke — L7
10 ton, 54" stroke — C32
15 ton, 18" stroke — C32
15 ton, 18" stroke — L7
15 ton, 54" stroke — L7
15 ton, 66" stroke — C32
20 ton, 60" stroke — L7
25 ton, 48" stroke — C32
25 ton, 66" stroke — C32
30 ton, 60" stroke — L7
40 ton, 60" stroke — L7
50 ton, 60" stroke — L7
Special — M13

Pull Up

6 ton, 42" stroke — C32
6 ton, 54" stroke — C32
8 ton, 24" stroke — A13
10 ton, 30" stroke — A13
10 ton, 36" stroke — L7
10 ton, 42" stroke — C32
10 ton, 48" stroke — L7
10 ton, 54" stroke — A13
15 ton, 36" stroke — A13
15 ton, 48" stroke — A13
15 ton, 48" stroke — C32
15 ton, 48" stroke — L7
15 ton, 60" stroke — L7
15 ton, 66" stroke — C32
20 ton, 36" stroke — A13
20 ton, 48" stroke — A13
25 ton, 36" stroke — A13
25 ton, 48" stroke — A13
25 ton, 48" stroke — C32
25 ton, 48" stroke — L7
25 ton, 60" stroke — L7
25 ton, 66" stroke — C32
30 ton, 60" stroke — A13
30 ton, 72" stroke — A13
Special — M13

Vertical Surface Machines

Single Ram

1 ton, 30" stroke — C12
2½ ton, 10" stroke — Z1
3 ton, 14" stroke — F14
3 ton, 30" stroke — A13
3 ton, 30" stroke — C12
3 ton, 30" stroke — L7
3 ton, 48" stroke — A13
3 ton, 48" stroke — C12
3 ton, 48" stroke — L7
4 ton, 24" stroke, Push, Pull — A13
5 ton, 12" stroke — A13
5 ton, 12" stroke — C12
5 ton, 42" stroke — F9
5 ton, 42" stroke — L7
5 ton, 54" stroke — A13
5 ton, 54" stroke — C12
5 ton, 54" stroke — F9
5 ton, 54" stroke — L7
6 ton, 20" stroke — F14
6 ton, 24" stroke, Push, Pull — A13
6 ton, 32" stroke, Push, Pull — A13
6 ton, 36" stroke, Push, Pull — A13
6 ton, 42" stroke — C12
6 ton, 54" stroke — C12
8 ton, 24" stroke, Push, Pull — A13
10 ton, 36" stroke, Push, Pull — A13
10 ton, 42" stroke — C12
10 ton, 42" stroke — C32
10 ton, 42" stroke — F9
10 ton, 42" stroke — L7
10 ton, 54" stroke — A13
10 ton, 54" stroke — C12
10 ton, 54" stroke — C32
10 ton, 54" stroke — F9
10 ton, 54" stroke — L7
10 ton, 66" stroke — C12
10 ton, 66" stroke — F9
12 ton, 24" stroke — F14
15 ton, 36" stroke, Push, Pull — A13
15 ton, 48" stroke — A13
15 ton, 48" stroke — C32
15 ton, 48" stroke — L7
15 ton, 48" stroke — F9
15 ton, 66" stroke — A13
15 ton, 66" stroke — C32
15 ton, 66" stroke — F9
15 ton, 66" stroke — L7
15 ton, 66" stroke — C12
20 ton, 24" stroke — F14
25 ton, 48" stroke — A13
25 ton, 48" stroke — C32
25 ton, 48" stroke — F9
25 ton, 48" stroke — L7
25 ton, 66" stroke — A13
25 ton, 66" stroke — C12
25 ton, 66" stroke — F9
25 ton, 66" stroke — L7
Special — M13

Double Ram

1 ton, 30" stroke — C12
3 ton, 30" stroke — A13
3 ton, 30" stroke — C12
3 ton, 30" stroke — L7
3 ton, 48" stroke — A13
3 ton, 48" stroke — C12
3 ton, 48" stroke — L7
5 ton, 12" stroke — A13
5 ton, 12" stroke — C12
5 ton, 12" stroke — F9
5 ton, 12" stroke — L7
5 ton, 54" stroke — A13
5 ton, 54" stroke — C12
5 ton, 54" stroke — F9
5 ton, 54" stroke — L7
6 ton, 42" stroke — C32
6 ton, 54" stroke — C32
10 ton, 42" stroke — A13
10 ton, 42" stroke — C32
10 ton, 42" stroke — F9
10 ton, 42" stroke — L7
10 ton, 54" stroke — A13
10 ton, 54" stroke — C12
10 ton, 54" stroke — C32
10 ton, 54" stroke — F9
10 ton, 54" stroke — L7
10 ton, 54" stroke — C12
10 ton, 66" stroke — C32
10 ton, 66" stroke — F9
15 ton, 48" stroke — A13
15 ton, 48" stroke — C32
15 ton, 48" stroke — L7
15 ton, 48" stroke — F9
15 ton, 66" stroke — A13
15 ton, 66" stroke — C32
15 ton, 66" stroke — F9
15 ton, 66" stroke — L7
25 ton, 48" stroke — A13
25 ton, 48" stroke — C32
25 ton, 48" stroke — F9
25 ton, 48" stroke — L7
25 ton, 66" stroke — A13
25 ton, 66" stroke — C32
25 ton, 66" stroke — F9
25 ton, 66" stroke — L7
Special — M13

Rotary

36" dia. table, Continuous Surface — A13
36" dia. table, Continuous Surface — A13
Special — M13

Vertical Push Down

1 ton, 12" stroke, Internal — C32
2 ton, 12" stroke, Internal — C32
2½ ton, 24" stroke — L7
4 ton, 12" stroke, Internal — C32
4 ton, 24" stroke, Internal and Surface — C32
5 ton, 24" stroke — L7
5 ton, 30" stroke — L7
5 ton, 36" stroke — L7
6 ton, 24" stroke, Internal and Surface — C32
6 ton, 36" stroke, Internal and Surface — C32
10 ton, 24" stroke — L7
10 ton, 30" stroke — L7
10 ton, 36" stroke, Internal and Surface — C32
10 ton, 36" stroke — L7
15 ton, 24" stroke — L7
15 ton, 30" stroke — L7
15 ton, 36" stroke — L7
Special — M13

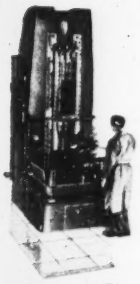
what type and size LAPOINTE BROACHING MACHINE do you need?

Whatever it is, you can be sure that it is available among the **more than 50** *types and sizes of broaching machines that are* **standard with LAPOINTE!**

Here are a few machines representing basic designs. They embody engineering skill and broaching experience extending back over fifty years — a wealth of experience exceeding that of every other broaching machine manufacturer.

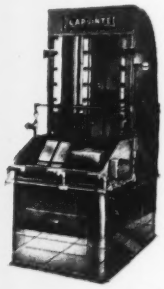
LAPOINTE can take the responsibility for the *complete broaching problem,* because we also design and build *fixtures* and *broaches* for use on our broaching machines.

SRV



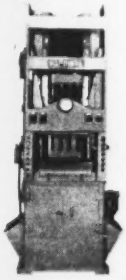
3 to 25 ton, 30″ to 90″ stroke

DRV



3 to 25 ton, 30″ to 90″ stroke

VPU

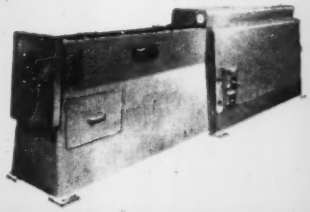


10 to 25 ton, 36″ to 60″ stroke

VPD

5 to 50 ton, 36″ to 60″ stroke

Write for Catalog No. 3

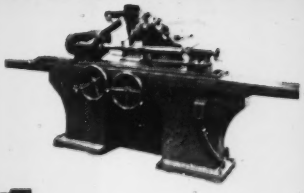


HP

2½ to 50 ton, 30″ to 78″ stroke

...and here's the *latest* LAPOINTE machine:

SRHE Capable of broaching speeds up to 300 fpm and *more!* Strokes 90″ up to 180″.

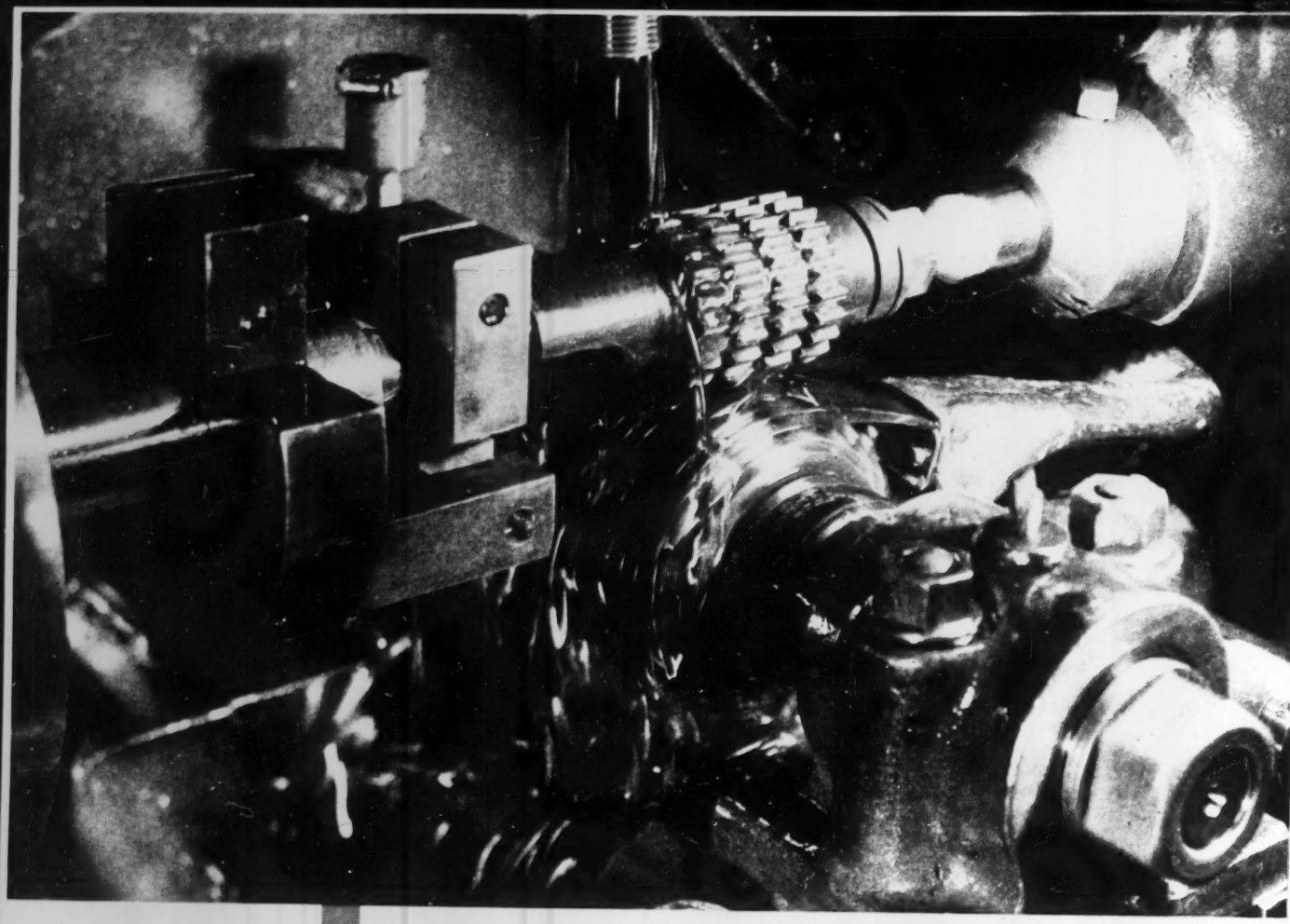


SHARPENERS in these sizes:
36″ 60″ 72″ 80″

THE LAPOINTE MACHINE TOOL COMPANY
HUDSON, MASSACHUSETTS • U. S. A.
In England: Watford, Hertfordshire

HUDSON LAPOINTE MASS

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES



MANUFACTURERS IN THIS SECTION

SECTION 3

Gear Cutting and Finishing Machines

Barber-Colman Co.—B6
Bilgram Gear & Machine Works—B21
Cleveland Hobbing Machine Co.—C23
Cross Co.—C49
Farrel-Birmingham Co. Inc.—F3
Fellows Gear Shaper Co.—F5
Gear Grinding Machine Co.—G4
Gleason Works—G12
Gould & Eberhardt Inc.—G16
Hamilton Tool Co.—H4
Lees-Bradner Co.—L13
Maynard Machine Shop Inc.—M10
Michigan Tool Co.—M21
Modern Industrial Engineering Corp.—M29
National Broach & Machine Co.—N3
Newark Gear Inc.—N10
Osborn Mfg. Co.—O6
Pratt & Whitney Div.
Niles-Bement-Pond Co.—P17
Sheffield Corp.—S9
Van Norman Co.—V2
Waltham Machine Works—W7

GEAR CUTTING AND FINISHING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Gear Hobbing Machines

Horizontal

1" dia., ¼" face, Automatic Bench Type	B6
2" dia. x 1.6" face	H4
5" dia., 7" face, General Purpose	B6
5" dia., 7" face, Precision Type	B6
6" dia. x .5" face	H4
8" max. dia., 1½" face	M21
10" dia., 10" face, Taper Spline	B6
10" dia., 12" face, Standard Bed	B6
10" dia., 30" face, Long Bed	B6
10" dia., 50" face, Extra Long Bed	B6
13" dia., 16" face	L13
14" dia., 14" face, Hydraulic	B6
20" dia., 10" face	L13

Vertical Plain

8" dia., 9" face	L13
8" dia., 21" face	L13
8" dia., 33" face	L13
18" dia., 10" face, Spur, Vertical	G16
18" dia., 11" face, Spur, Vertical	G16
24" dia., 15" face, Spur, Vertical	G16
36" dia., 15" face, Spur, Vertical	G16
48" dia., 16" face, Spur, Vertical	G16
60" dia., 18" face, Spur, Vertical	G16

Vertical Universal

8" pitch dia., 8" face	C23
8" pitch dia., 16" face	C23
16" pitch dia., 16" face	C23
18" dia., 10" face, Spur & Helical, External	G16
18" dia., 11" face, Spur & Helical, External	G16
18" dia. x 14" face	N10
24" dia., 15" face, Spur & Helical, External	G16
36" dia., 15" face, Spur & Helical, External	G16
48" dia., 16" face, Spur & Helical, External	G16
48" dia., 24" face	N10
72" dia., 32" face	N10
90" dia., 24" face, Spur & Helical, External	G16
111" dia., 36" face, Spur & Helical, External	G16
120" dia., 42" face, Spur & Helical, External	G16
132" dia., 48" face, Spur & Helical, External, Two Cutter Heads	G16
144" dia., 48" face, Spur & Helical, External, Two Cutter Heads	G16

Vertical Cone Type

36" dia. cap	G16
48" dia. cap	G16
72" dia. cap	G16
84" dia. cap	G16
108" dia. cap	G16

Vertical Rotary

5" pitch dia., 6" face	C23
8" dia., 9" face, 4-Spindle	L13
8" dia., 9" face, 6-Spindle	L13
8" dia., 9" face, 8-Spindle	L13
8" pitch dia., 16" face	C23
8" dia., 21" face, 4-Spindle	L13
8" dia., 21" face, 6-Spindle	L13
8" dia., 21" face, 8-Spindle	L13
8" pitch dia., 25" to 41" length	C23
8" dia., 33" face, 4-Spindle	L13
8" dia., 33" face, 6-Spindle	L13
8" dia., 33" face, 8-Spindle	L13

Worm Gear Straight

12" dia. cap	G16
24" dia. cap	G16
36" dia. cap	G16
48" dia. cap	G16
72" dia. cap	G16
84" dia. cap	G16

Gear Shaping Machines

Spur, External & Internal

18" pitch dia., 3" face	F5
18" pitch dia., 5" face ext., 3" face int.	F5
27½" pitch dia., 5" face ext., 25" pitch dia., 3" face int.	F5
35" pitch dia., 5" face ext., 25" pitch dia., 3" face int.	F5
36" pitch dia., 5" face ext., 13" pitch dia. int.	F5
3" dia., 2½" face, external only	M21
5" dia., 2½" face, external only	M21
7" dia., 2½" face, external only	M21
10" dia., 1½" face, external only	M21
72" pitch dia., 3" face, internal only	F5

Spur & Helical External & Internal

3" pitch dia., ½" face	F5
7" pitch dia., 1½" face ext., spur, 6½" pitch dia., ext. helical (3½" pitch dia., 1" face int., spur & helical)	F5
7" pitch dia., 2" face ext., spur & helical, 6" pitch dia., int.	F5
12" pitch dia., 3" face, Rotary	F5
18" pitch dia., 3" face, spur & helical	F5
18" pitch dia., 5" face ext., spur & helical, 3" face int.	F5
27½" pitch dia., 5" face ext., spur & helical, 21" pitch dia., 3" face int., spur & helical	F5
35" pitch dia., 5" face ext., spur & helical, (24" pitch dia., 3" face int., spur & helical)	F5
35" pitch dia., 5" face ext., spur & helical, 25" pitch dia., spur, 24" pitch dia., helical, 3" face int.	F5
36" pitch dia., 5" face ext., spur & helical (13" pitch dia., int., spur & helical)	F5
36" pitch dia., 6" face ext. & int., spur & helical (3 DP, spur, 1.5 DP, helical)	F5
96" pitch dia., 8" face ext., spur & helical (3.5" pitch dia., int., spur & helical)	F5
100" pitch dia., 8" face ext. & int., spur & helical	F5
120" pitch dia., 8" face ext. & int., spur & helical	F5

Spur & Helical Continuous Herringbone

12" dia., 5" face	F3
25" dia., 8" face	F3
37" dia., 10" face	F3
49" dia., 18" face	F3
61" dia., 18" face	F3
120" dia., 21" face	F3
240" dia., 54" face	F3

Shapers, Not Elsewhere Classified

1½" face, Special Indexing, External & Internal Straight-Sided Splines	F5
2" face, Special Indexing, External & Internal Straight-Sided Splines	F5
3" face, 60" length of rack, Rack Shaper, Spur & Helical Tooth Racks	F5
4" pitch dia., Side Trimming Internal Helical Gear Type Clutches	F5
4" pitch dia., Side Trimming Internal Spur Gear Type Clutches	F5
6" pitch dia., Side Trimming Internal Helical Gear Type Clutches	F5
6" pitch dia., Side Trimming Internal Spur Gear Type Clutches	F5
8" pitch dia., 5" face, Horizontal Gears & Splines on Long Shafts	F5
8" dia., 18½" length, 2" face, Rack Type	M21

Form Milling Type

Spur

1½" dia., Pinion & Gear	W7
2" dia.	W7
4" dia.	W7
30" dia., 12" face	M10
36" dia., 12" face	G16
40" dia., 15" face	M10
40" dia., 16" face	N10
48" dia., 16" face	N10
72" dia., 16" face	G16
72" dia., 16" face	N10
100" dia., 24" face	N10
84" dia., 32" face	N10

Spur & Rough Bevel

36" dia., 12" face, Spur & Bevel Gears	G16
72" dia., 11" face, Spur & Bevel Gears	G16

Multiple Spindle

5½" dia. cap., 3 spindles, Spur & Rough Bevel	G16
6" dia. cap., 2 spindles, Rough Bevel	G16
9" dia. cap., 3 spindles, Spur	G16
9" dia. cap., 3 spindles, Spur & Rough Bevel	G16

Gear Cutting, Planer Type

Bevel

60" dia., 38½" cone, 14" face	G12
66" dia., 33" cone, 10" face	G12

Bevel & Spur

80" dia., 53" cone, 20" face	G12
102" dia., 101" cone, 34" face	G12

Spur Internal

111" dia., 18" face (for spurs)	G12

GEAR CUTTING AND FINISHING MACHINES

(Code number following each listing indicates manufacturer; key on page S21)

Bevel Gear Cutting

Straight

6" dia., 3" face ... B21
8" dia., 3" face ... B21
16" dia., 6" face ... B21

Spiral Bevel & Hypoid

4¼" dia., 2¼" cone, 7/16" face ... G12
4½" dia., 2¼" cone, 5/8" face ... G12
7" dia., 5" cone, 1" face ... G12
8½" dia., 4½" cone, 1¼" face ... G12
13" dia., 6½" cone, 1¾" face, Gear Rougher ... G12
13" dia., 6½" cone, 1¾" face, Gear Finisher ... G12
14" dia., 7⅛" cone, 2" face, Gear Rougher ... G12
18" dia., 9" cone, 1⅝" face ... G12
18" dia., 9" cone, 1⅝" face, Pinion Rougher ... G12
18" dia., 9" cone, 2½" face, Gear Rougher ... G12
22" dia., 11" cone, 4" face, Gear Rougher ... G12
22" dia., 11" cone, 4" face, Gear Finisher ... G12
24" dia., 12" cone, 3½" face ... G12
33" dia., 13⅞" cone, 4" face, Pinion Rougher ... G12
33" dia., 16½" cone, 4" face ... G12
35½" dia., 17¾" cone, 6" face ... G12

Gear Tooth Finishing Machines

Grinding

1½" to 12" pitch dia., Spur ... N3
3" to 18" pitch dia., Spur ... N3
3¼" to 12" pitch dia., Spur & Helical ... N3
4½" to 18" pitch dia., Spur & Helical ... N3
6" dia., 24" cc., Spline-External ... G4
6" dia., 48" cc., Spline-External ... G4
8½" dia., 4¼" cone, 1¼" face, Spiral Bevel, Hypoid & Zerol ... G12
10" dia., 24" cc. Gear & Spline-External Spur ... G4
10" dia., 48" cc. Gear & Spline-External Spur ... G4
10½" dia., 1¾" face, Spur and Helical ... P17
10½" dia., 5¾" face, Spur and Helical ... P17
14" swing, 20" cc. Spline & Gear ... V2
14" swing, 32" cc. Spline & Gear ... V2
14" swing, 36" cc. Spline & Gear ... V2
14" swing, 48" cc. Spline & Gear ... V2
14" swing, 60" cc. Spline & Gear ... V2
14" swing, 72" cc. Spline & Gear ... V2
16" dia., 3" face, Gear & Spline-Internal Spur ... G4
16" dia., 18" cc. Gear & Spline-External Spur ... G4
16" dia., 42" cc. Gear & Spline-External Spur ... G4
18½" dia., 5¾" face, Spur and Helical ... P17
24" dia., Coupling Grinder ... G12
24" dia., 12½" cone, 3½" face, Spiral Bevel, Hypoid & Zero ... G12
30" dia., 6" face, Gear-Internal Spur ... G4
31½" dia., 15" cone, 3" face, Spiral Bevel, Hypoid & Zerol ... G12
36" dia., 30" cc. Gear-External Spur ... G4
36" dia., 48" cc. Gear-External Spur ... G4

Lapping

½" to 8" pitch dia., Rotary Spur & Helical ... N3
1" to 8" pitch dia., Rotary Spur & Helical ... N3
3" to 18" pitch dia., Rotary Spur & Helical ... N3
7" pitch dia. ext. helical, 1⅞" face, 8" pitch dia. int., External & Internal, Spur & Helical Gears ... F5
8" dia., 3" face, Rotary, External ... M21
10" pitch dia., 1⅞" face, External Helical Gears ... F5
10" pitch dia. ext. helical, 1⅞" face, 13" pitch dia. int., External & Internal Spur & Helical Gears ... F5
13" dia., Spiral Bevel & Hypoid Angular ... G12
17" dia., Spiral Bevel & Hypoid ... G12
18" max. dia., 3" face, Rotary, Internal ... M21
20" dia., 5" face, Rotary, External ... M21
27" max. dia., 5" face, Rotary, Internal ... M21
32" dia., Spiral Bevel & Hypoid ... G12

Shaving

⅛" to 4" pitch dia., Rotary Spur & Helical ... N3
½" to 8" pitch dia., Rotary Spur & Helical ... N3
½" to 12" pitch dia., Rotary Spur & Helical ... N3
1" to 8" pitch dia., Rotary Spur & Helical ... N3
1" to 12" pitch dia., Rotary Spur & Helical ... N3
2½" to 18" pitch dia., Rotary Spur & Helical ... N3
3" to 8" pitch dia., Rotary Spur & Helical ... N3
3" to 12" pitch dia., Rotary Spur & Helical ... N3
3" to 18" pitch dia., Rotary Spur & Helical ... N3
3" to 24" pitch dia., Rotary Spur & Helical ... N3
3½" to 17" pitch dia., Rotary Spur & Helical ... N3
4" to 36" pitch dia., Rotary Spur & Helical ... N3
4" to 48" pitch dia., Rotary Spur & Helical ... N3
4" pitch dia., 1" face ... F5
4" max. dia., 1" face, Rotary, External ... M21
5" to 30" pitch dia., Rotary Spur & Helical ... N3
6" to 24" pitch dia., Rotary Spur & Helical ... N3
1½" face, Internal Spur & Helical ... F5
8" pitch dia., 2½" face ... F5
8" max. dia., 2½" face, Rotary, External ... M21
8" max. dia., 5" face, Rotary, External ... M21
12" to 36" pitch dia., Rotary Spur & Helical ... N3
12" max. dia., 2½" face, Rotary, External ... M21
12" pitch dia., 3" face, External, Spur & Helical ... F5
12" max. dia., 4¼" face, Rotary, Internal ... M21
12" max. dia., 5" face, Rotary, External ... M21
18" max. dia., 2½" face, Rotary, External ... M21
18" max. dia., 4¼" face, Rotary, Internal ... M21
18" pitch dia., 5" face, External, Spur & Helical ... F5
18" max. dia., 5" face, Rotary, External ... M21
18" max. dia., 5" face, Comb. Internal & External ... M21
22" to 48" pitch dia., Rotary Spur & Helical ... N3
24" max. dia., 4¼" face, Rotary, Internal ... M21
24" pitch dia., 5" face, External, Spur & Helical ... F5
24" max. dia., 5" face, Comb. Internal and External ... M21
24" to 96" pitch dia., Rotary Spur & Helical ... N3
25" to 100" pitch dia., Rotary Spur & Helical ... N3
30" to 180" pitch dia., Rotary Spur & Helical ... N3
36" dia., 8" face, Vertical ... M21
36" max. dia., 36" face, Internal, External, 2 Spindles ... M21
48" to 120" pitch dia., Rotary Spur & Helical ... N3
48" dia., 8" face, Vertical ... M21
48" dia., 30" face, Vertical ... M21
48" max. dia., 36" face, 2 Spindles, Internal, External ... M21
72" dia., 50" face, Vertical ... M21
120" dia., 50" face, Vertical ... M21
180" dia., 65" face, Vertical ... M21

Burnishing

4" pitch dia., ½" face ... F5
17" dia., Pinion Spiral Bevel & Hypoid ... G12

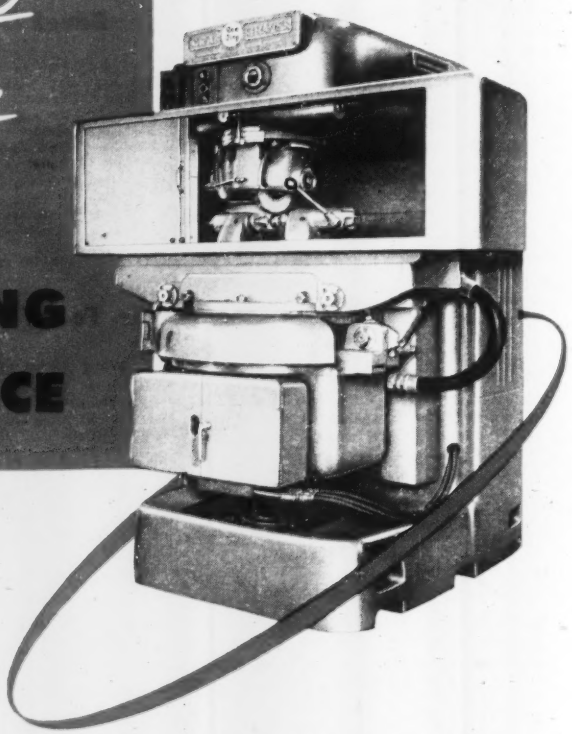
Chamfering, Pointing & Rounding

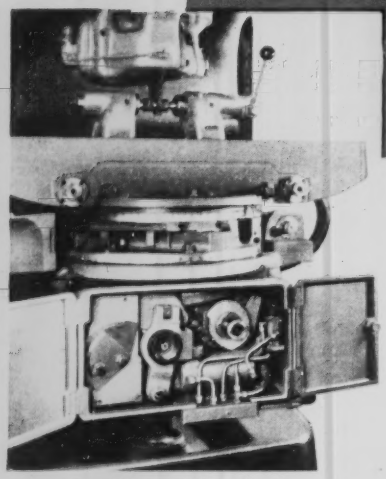
⅝" to 3½" pitch dia., Chamfering and Burring ... M29
½" to 1¼" dia., Deburring Machine, External Gear & Spline ... S9
1" to 4" dia., Deburring Machine, External Gear & Spline ... S9
1" to 7" dia., Deburring Machine, External Spur & Helical Gears ... S9
1" to 14" dia., Deburring Machine, External Spur, Helical & Spiral Straight & Bevel Gears ... S9
3" to 9½" pitch dia., Chamfering and Burring ... M29
4½" to 15" dia., Deburring Machine, External Gear & Spline ... S9
7" dia., Deburring Machine, External Gear & Spline ... S9
7" to 20" dia., Deburring Machine, External Gear & Spline ... S9
10" dia., 9" face, Pointing & Chamfering Machine, Gear Tooth ... C19
10" dia., 10" face, Burring & Chamfering Machine, Gear Tooth ... C19
13" max. dia., Chamfering Machine, External & Internal Spur, Helical ... S9
13" max. dia., double spindle, Chamfering Machine, External & Internal Spur, Helical ... S9
18" dia., Chamfering ... B21
18" dia., 14" face, Chamfering Machine, Universal Gear Tooth ... C19
18" dia., 14" face, Rounding, Pointing & Chamfering Machine, Gear Tooth ... C19
Double work station, Chamfering Machine, External & Internal Spur, Helical ... S9
Special, Chamfering and Burring ... M29
Special, Brush-Type Deburring ... O6
Special, Deburring Machine, Internal Spline & Gear ... S9

Gear Cutting Machines Not Elsewhere Classified

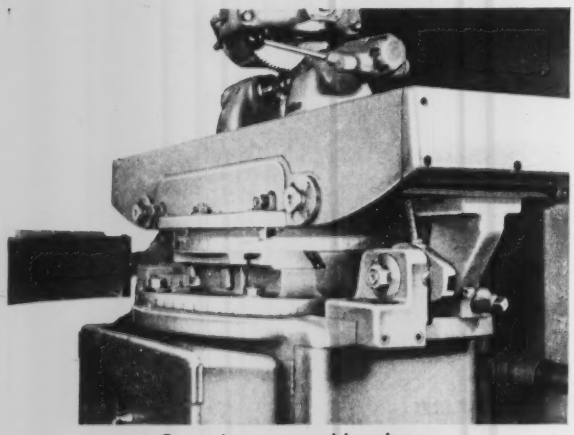
7854 CP or ⅜ DP, 15° HA, Thread Generator, Hourglass Worms ... F5
4" OD, 12" lgth., Thread, 18° cc. Thread Generator, Straight-Worms & Threads ... F5
16 DP, 15° HA, 2" OD, 2½" length, Thread Generator, Straight-Worms & Threads ... F5
48" length, 6" face, Rack Cutting Spur ... G16
72" length, 10" face, Rack Cutting Spur ... G16

An Important Contribution To GEAR SHAVING PRACTICE





Differential up-feed mechanism



Crowning cam and bracket

Two new features are now optionally available with the Red Ring Gear Shaving Machine Model GCU — Automatic Differential Up-feed and Conventional Crowning. So equipped, any of the recognized processes in the field of rotary gear shaving may be performed on this machine. It thus becomes economically applicable to both high production and to job shop operations and to gears of all characteristics within its size range.

Specifically the Model GCU with these additions can be used for:

(1) Diagonal shaving at fixed center distance on a two stroke cycle.
(2) Diagonal shaving on an automatic multi-stroke cycle with selected increments of up-feed and dwell.
(3) Conventional shaving on an automatic multi-stroke cycle with selected increments of up-feed and dwell.
(4) Precision gear crowning accomplished by rocking the table during any conventional shaving cycle.
(5) Taper shaving to specification.

Automatic cycling is precise and very fast. Production rates are high and cutter life has been increased to as much as 200%.

Write for Bulletin S53-7 which gives all the details of this important new development.

6501

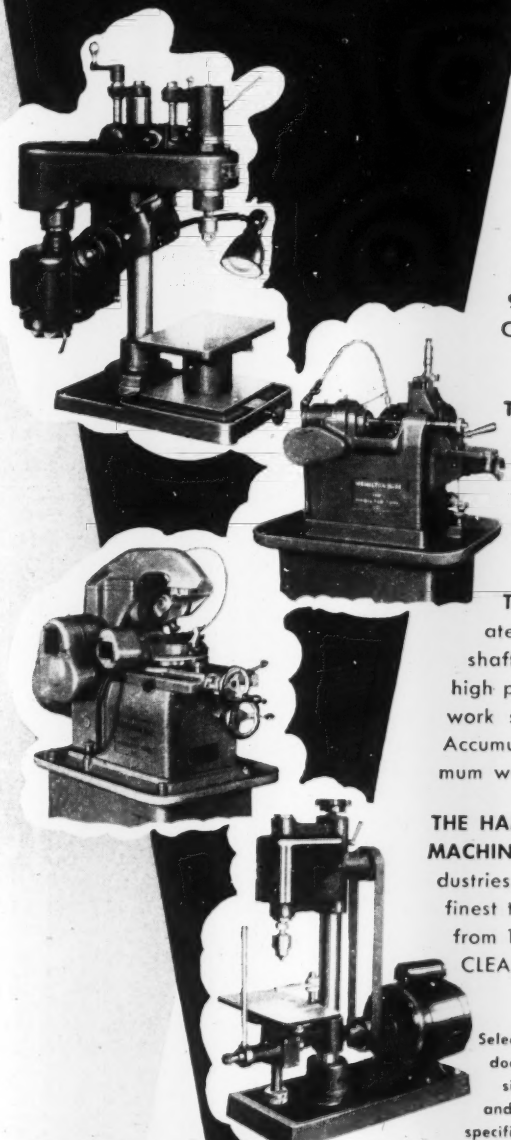
SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORM

NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN . . . . . DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

Hamilton PRECISION DRILLING MACHINES • TAPPING MACHINES GEAR HOBBERS



If your work can be done within the framework of the specifications of these machines you can not buy a more precise tool than one bearing the Hamilton nameplate.

THE HAMILTON VARIMATIC® SUPER SENSITIVE DRILLING MACHINE is designed for the accurate production-drilling of small holes in all drillable materials. Its capacity ranges from .004" to .3125" and its spindle speeds, which range from 840 to 9300 R.P.M., are infinitely variable.

CLEARANCES Center of chuck to column..... 5"
Round table to chuck.....10"

THE HAMILTON NO. 00 PRECISION GEAR HOBBER is a machine of extra precision and extra rigidity. It is used for the generation of spur gears and pinions to 2" outside diameter of the workpiece. Alignment and trueness of the work spindle and hob spindle is held to within .0002". Accumulative error is regularly held to .0002" or less.

THE HAMILTON NO. 1 PRECISION GEAR HOBBER generates spur and spiral gears, worms and worm gears, splined shafts, gear sectors and pinions of extra accuracy and at high production speeds. The alignment and trueness of the work spindle and hob spindle is held to within .0002". Accumulative error is regularly held to .0002" or less. Maximum workpiece diameter is 6".

THE HAMILTON SUPER SENSITIVE, SMALL HOLE TAPPING MACHINE is designed and built to serve the precision industries. Its tapping capacity is from the smallest and finest tap to 10/32 inclusive. Its spindle speeds range from 1200 to 2600 R.P.M.

CLEARANCES Center of chuck to column....3¼"
Round table to chuck.....4"

Selection of a Hamilton tool, even though your present work does not require Hamilton accuracy, is a wise and far-sighted decision, for Hamilton's production potential and "reserve of accuracy" permits you to face possible specification changes with complete confidence.

Prepare now to meet restless competition in the months ahead. Equip your plant for precision production and be confident that your competition can not deliver more.

Mail the coupon today for complete FREE information on any or all of the Hamilton machines shown.

THE Hamilton TOOL COMPANY
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THE HAMILTON TOOL COMPANY
HAMILTON, OHIO

5336

Gentlemen: Please send FREE literature as checked.

- Hamilton No. 1 Precision Gear Hobber ☐
- Varimatic Drilling Machine ☐
- Hamilton No. 00 Precision Gear Hobber ☐
- Hamilton Tapping Machine ☐

Name (Company) _____

Name (Individual) _____

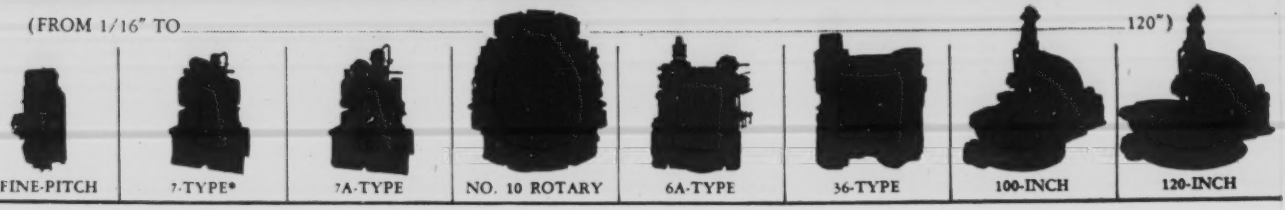
Street _____

City and State _____

Fellows STANDARD EQUIPMENT FOR CUTTING, FINISHING AND TESTING GEARS

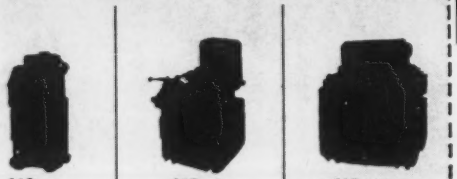
PRODUCTION

(FROM 1/16" TO 120")



	3" FINE-PITCH	7-TYPE*	7A-TYPE	NO. 10 ROTARY	6A-TYPE	36-TYPE	100-INCH	120-INCH
SPUR AND HELICAL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EXTERNAL AND INTERNAL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MAX. PITCH DIAMETER	3"	7" spur, 6½" hel.	7" spur, 7" hel.	12"	18"	36"	100"	120"
MAX. DIAMETRAL PITCH	40 steel, 30 brass	6 spur, 6/8 hel.	5/7 spur, 6 hel.	3/4 spur, 5/7 hel.	3/4 spur, 5/7 hel.	3 spur, 4/5 hel.	2 spur, 4 hel.	2 spur, 4 hel.
MAX. FACE WIDTH	¾" ext.	1½" ext., 1" int.	2" ext., 2" int.	3" ext., 3" int.	5" ext., 3" int.	6" ext., 6" int.	8" ext., 8" int.	8" ext., 8" int.
STROKES PER MINUTE Max.	2000	450	450	500	300	300	148	148

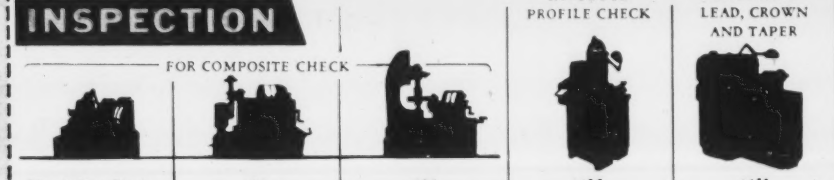
SHAVING



	NO. 4 FINE PITCH	NO. 8 'FULL-TOOL'	NO. 11 INTERNAL
SPUR AND HELICAL	Yes	Yes	Yes
EXTERNAL AND INTERNAL	Ext. only	Yes	Int. only
MAX. PITCH DIAMETER	4"	8"	***
MAX. DIAMETRAL PITCH	20	4	6
MAX. FACE WIDTH	1"	2½"	1½" up to 10 p. 1" 12 to 16 p.
MAX. SPREAD OF CENTERS	12"	**	—

Also 12", 18" and 24" machines for externals only.

INSPECTION



	No. 4 Fine Pitch RED LINER	8M RED LINER	20M RED LINER	12M INVOLUTE	12H LEAD
SPUR AND HELICAL	Yes	Yes	Yes	Yes	Yes
EXTERNAL AND INTERNAL	Yes	Yes	Yes	Yes	Yes
MAX. PITCH DIAMETER	4"	***	18"	12"	12"

*Max. P.D. internal—5½". **Depends upon work-holding fixture. ***Depends upon design of gear.

LITERATURE is available on all of the standard equipment shown above. Fellows, in addition, builds two sizes of Plastics Injection Molding Machines, the 5C-8 having 8 ounce capacity, and the 1B-3-15 with 3 ounce capacity. Write for complete information on your production problem. The Fellows Gear Shaper Company. Head Office and Export Department. 78 River Street, Springfield, Vermont. Branch Offices: 323 Fisher Building, Detroit 2 • 5835 West North Avenue, Chicago 39 • 2206 Empire State Building, New York 1.

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1. Burrs and chamfers both spur and helical gears.
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3. Burrs and chamfers both sides and root of tooth at more than five teeth per second.
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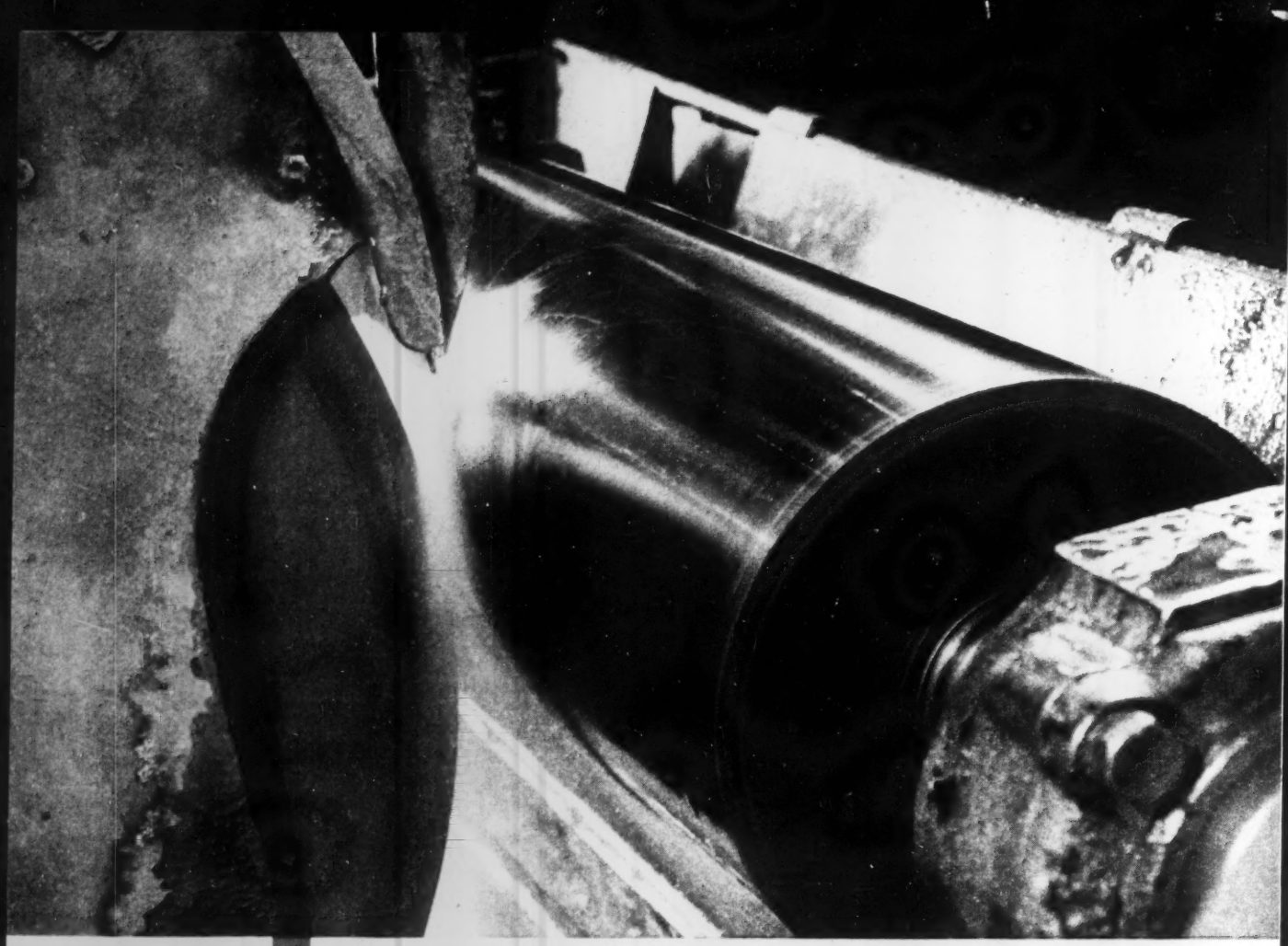


MANUFACTURERS IN THIS SECTION

Abrasive Machine Tool Co.—A2
Acme Mfg. Co.—A5
American Broach & Machine Co.
Div. Sundstrand Machine Tool Co.—A13
Arter Grinding Machine Co.—A20
Atlas Press Co.—A21
The Baird Machine Co.—B1
Baker Brothers Inc.—B2
Baldor Electric Co.—B3
Barber-Colman Co.—B6
Barnes Drill Co.—B8
W. F. & John Barnes Co.—B9
Besly-Welles Co.—B16
Bignall & Keeler—B20
The Black & Decker Mfg. Co.—B23
Black Diamond Saw & Machine Works—B24
Black Rock Mfg. Co.—B25
Edward Blake Co.—B26
The Blanchard Machine Co.—B27
J. G. Blount Co.—B30
Henry P. Boggis & Co.—B32
Boyar-Schultz Corp.—B34
The Bradford Machine Tool Co.—B36
Brown-Brockmeyer Co.—B43
Brown & Sharpe Mfg. Co.—B44
Bryant Chucking Grinder Co.—B45
Buehler Ltd.—B46
Champion Blower & Forge Co.—C5
Cincinnati Electrical Tool Co.—C9
Cincinnati Milling Machine Inc.—C12
Cleveland Grinding Machine Co.—C22
Clizbe Brothers Mfg. Co.—C28
Cochrane-Bly Co.—C30
Colonial Broach Co.—C32
Consolidated Machine Tool Corp.
Div. Farrel Birmingham Co.—C36
Continental Machine Co.—C37
Coulter & McKenzie Machine Co.—C42
Covel Mfg. Co.—C43
Crane Packing Co.—C45
J. B. Crosman & Son Inc.—C48
Crystal Lake Grinders—C52
Dalzen Tool & Mfg. Co.—D2
Delta Tool Div.
Rockwell Mfg. Co.—D6
DoAll Co.—D17
Duro Metal Products Co.—D20
Dyknex Corp.—D21
Eastern Machine Screw Corp.—E1
Enterprise Co.—E15
Espen-Lucas Machine Works—E17
Ex-Cell-O Corp.—E19
Farrel-Birmingham Co. Inc.—F3
Fellows Gear Shaper Co.—F5
Foote-Burt Co.—F9
Forbes & Myers—F10
Fox Grinders Inc.—F15
Frauenthal Div.—F17
C. Allen Fulmer Co.—F20

SECTION 4

Grinding, Honing and Lapping Machines

Gallmeyer & Livingston Co.—G1
Gardner Machine Co.—G2
Gisholdt Machine Co.—G10
Gleason Works—G12
George Gorton Machine Co.—G14
Grinders & Fixtures Inc.—G24
The Grinding & Polishing Machine Corp.—G25
Hammond Machinery Builders Inc.—H5
Hanchett Mfg. Co.—H6
Hanson-Whitney Machine Co.—H8
Harvey Mfg. Corp.—H11
Heald Machine Co.—H13
Hill Acme Co.—H20
Hisey-Wolf Machine Co.—H22
Ingersoll Milling Machine Co.—I4
Jones & Lamson Machine Co.—J5
Kearney & Trecker Corp.—K4
Kling Brothers Engineering Works—K12
Lambert Inc.—L3
Landis Machine Co.—L4
Landis Tool Co.—L5
Lapointe Machine Tool Co.—L7
H. Leach Machinery Co.—L9
R. K. Leblond Machine Tool Co.—L10
K. O. Lee Co.—L11
Lempco Products Inc.—L18
Lima Electric Motor Co.—L21
Lippman Engineering Works—L24
Lobdell United Co.—L25
Mattison Machine Works—M8
Max Mfg. Co.—M9
McDonough Mfg. Co.—M11
Mercury Engineering Corp.—M16
Mesta Machine Co.—M18
Micromatic Hone Corp.—M22
Minit Cutter Grinder Co.—M27
Moline Tool Co.—M31
Moore Special Tool Co. Inc.—M33
Motch & Merryweather Machinery Co.—M37
Mummert-Dixon Co.—M38
National Acme Co.—N1
New Hermes Inc.—N9
Nife Inc.—N12
Norton Co.—N14
Nicholas Equipment Co.—N16
Oliver Instrument Co.—O2
Parker-Majestic Inc.—P2
Peerless Machine Co.—P4
Peterson Welding Laboratories—P6
Porter-McLeod Machine Tool Co. Inc.—P13
Pratt & Whitney Div.
Niles-Bement-Pond Co.—P17
H. P. Preis Engraving Machine Co.—P18
Production Machine Co.—P21
Thomas Prosser & Son—P24
Queen City Machine Tool Co.—Q1
Reid Brothers Co. Inc.—R6
Rice Pump & Machine Co.—R8
Rivett Lathe & Grinder Inc.—R11
L. Robaczynski Machine Co.—R12
The Rowbottom Machine Co. Inc.—R19
Royal Oak Tool & Machine Co.—R20
Ryman Engineering Co.—R22
Sanford Mfg. Co.—S1
Sheffield Corp.—S9
Size Control Co.—S18
South Bend Lathe Works—S25
Springfield Machine Tool Co.—S28
Standard Electrical Tool Co.—S30
Staple Engineering Co.—S33
Storm-Vulcan Inc.—S40
Sunnen Products Co.—S41
Superior Hone Corp.—S44
Taft-Pierce Mfg. Co.—T2
Thompson Grinder Co.—T7
Thor Power Tool Co.—T8
Thornton Mechanical Laboratory—T9
United States Electrical Tool Co.—U4
Van Norman Co.—V2
Wadell Equipment Co.—W2
O. S. Walker Co. Inc.—W5
Walker-Turner Div.
Kearney & Trecker Corp.—W6
Waterbury Tool Div.
Vickers—W11
S. A. Woods Machine Co.—W20
Worcester Polytechnic Institute
Washburn Shops—W21
Yates American Machine Co.—Y1

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

External Cylindrical

Plain Standard

3" swing, 18" cc . . . B44
4" swing, 8" cc, Hand Feed, Bench . . . C52
4" swing, 18" cc . . . L5
4" swing, 12" cc . . . C12
4" swing, 12" cc . . . N14
4" swing, 18" cc . . . C12
4" swing, 18" cc . . . N14
5" swing, 8" cc, Bench . . . C52
5" swing, 18" cc, Automatic . . . A20
6" swing, 18" cc . . . C12
6" swing, 18" cc . . . L5
6" swing, 18" cc . . . N14
6" swing, 18" cc, 30° Angular Slide . . . N14
6" swing, 30" cc . . . C12
6" swing, 30" cc . . . L5
6" swing, 30" cc . . . N14
8" swing, 8" cc, Bench . . . C52
8" swing, 8½" cc . . . R11
8" swing, 9½" cc . . . A20
10" swing, 12" table travel . . . P2
10" swing, 18" cc . . . C12
10" swing, 18" cc . . . L5
10" swing, 18" cc . . . N14
10" swing, 24" table travel . . . P2
10" swing, 30" cc . . . C12
10" swing, 30" cc . . . L5
10" swing, 30" cc . . . N14
10" swing, 30" table travel . . . P2
10" swing, 36" cc . . . C12
10" swing, 36" cc . . . L5
10" swing, 36" cc . . . N14
10" swing, 36" cc, 30° Angular Slide . . . N14
10" swing, 48" cc . . . C12
10" swing, 48" cc . . . L5
10" swing, 48" cc . . . N14
10" swing, 72" cc . . . C12
10" swing, 72" cc . . . L5
10" swing, 72" cc . . . N14
10" swing, 96" cc . . . C12
10" swing, 96" cc . . . L5
10" swing, 96" cc . . . N14
10" swing, 120" cc . . . L5
10" swing, 120" cc . . . N14
12" swing, 24" cc . . . R11
14" swing, 18" cc . . . C12
14" swing, 18" cc . . . L5
14" swing, 18" cc . . . N14
14" swing, 24" cc . . . R11
14" swing, 36" cc . . . C12
14" swing, 36" cc . . . L5
14" swing, 36" cc . . . N14
14" swing, 48" cc . . . C12
14" swing, 48" cc . . . L5
14" swing, 48" cc . . . N14
14" swing, 72" cc . . . C12
14" swing, 72" cc . . . L5
14" swing, 72" cc . . . N14
14" swing, 96" cc . . . C12
14" swing, 96" cc . . . L5
14" swing, 96" cc . . . N14
14" swing, 120" cc . . . C12
14" swing, 120" cc . . . L5
14" swing, 120" cc . . . N14
14" swing, 144" cc . . . C12
14" swing, 144" cc . . . L5
14" swing, 144" cc . . . N14
14" swing, 168" cc . . . C12
14" swing, 168" cc . . . L5
14" swing, 168" cc . . . N14
16" swing, 36" cc . . . C12
16" swing, 36" cc . . . N14
16" swing, 48" cc . . . C12
16" swing, 48" cc, Heavy Duty . . . C12
16" swing, 48" cc . . . N14
16" swing, 72" cc . . . C12
16" swing, 72" cc, Heavy Duty . . . C12
16" swing, 72" cc . . . N14
16" swing, 96" cc . . . C12
16" swing, 96" cc, Heavy Duty . . . C12
16" swing, 96" cc, 40" gap, 96" cc . . . C12
16" swing, 96" cc . . . N14
16" swing, 120" cc . . . C12
16" swing, 120" cc, Heavy Duty . . . C12
16" swing, 40" gap, 120" cc . . . C12
16" swing, 120" cc . . . N14
16" swing, 144" cc . . . C12
16" swing, 144" cc, Heavy Duty . . . C12
16" swing, 40" gap, 144" cc . . . C12
16" swing, 144" cc . . . N14
16" swing, 168" cc . . . C12
16" swing, 168" cc, Heavy Duty . . . C12
16" swing, 40" gap, 168" cc . . . C12
16" swing, 168" cc . . . N14
16" swing, 192" cc, Heavy Duty . . . C12
16" swing, 216" cc, Heavy Duty . . . C12
16" swing, 240" cc, Heavy Duty . . . C12
18" swing, 48" cc . . . L5
18" swing, 48" cc . . . N14
18" swing, 72" cc . . . L5
18" swing, 72" cc . . . N14
18" swing, 96" cc . . . L5
18" swing, 96" cc . . . N14
18" swing, 120" cc . . . L5
18" swing, 120" cc . . . N14
18" swing, 144" cc . . . L5
18" swing, 144" cc . . . N14
18" swing, 168" cc . . . L5
18" swing, 168" cc . . . N14
18" swing, 192" cc . . . L5
18" swing, 192" cc . . . N14
18" swing, 216" cc . . . L5
18" swing, 216" cc . . . N14
18" swing, 240" cc . . . L5
18" swing, 240" cc . . . N14
20" swing, 24" cc . . . L5
20" swing, 36" cc . . . L5
20" swing, 48" cc . . . L5
20" swing, 48" cc . . . N14
20" swing, 72" cc . . . L5
20" swing, 72" cc . . . N14
20" swing, 96" cc, Heavy Duty . . . C12
20" swing, 96" cc . . . L5
20" swing, 96" cc . . . N14
20" swing, 96" cc, Trav. Table Type . . . N14
20" swing, 120" cc, Heavy Duty . . . C12
20" swing, 120" cc . . . L5
20" swing, 120" cc . . . N14
20" swing, 120" cc, Trav. Table Type . . . N14
20" swing, 144" cc, Heavy Duty . . . C12
20" swing, 144" cc . . . L5
20" swing, 144" cc . . . N14
20" swing, 144" cc, Trav. Table Type . . . N14
20" swing, 168" cc . . . C12
20" swing, 168" cc, Heavy Duty . . . C12
20" swing, 168" cc . . . L5
20" swing, 168" cc . . . N14
20" swing, 168" cc, Trav. Table Type . . . N14
20" swing, 192" cc . . . L5
20" swing, 192" cc, Heavy Duty . . . C12
20" swing, 192" cc . . . L5
20" swing, 192" cc, Trav. Table Type . . . N14
20" swing, 216" cc . . . L5
20" swing, 240" cc . . . N14
24" swing, 36" cc . . . C12
24" swing, 48" cc . . . C12
24" swing, 48" cc . . . L5
24" swing, 48" cc . . . N14
24" swing, 72" cc . . . C12
24" swing, 72" cc . . . L5
24" swing, 72" cc . . . N14
24" swing, 96" cc . . . C12
24" swing, 96" cc, Heavy Duty . . . C12
24" swing, 96" cc . . . L5
24" swing, 96" cc . . . N14
24" swing, 96" cc, Trav. Table Type . . . N14
24" swing, 120" cc . . . L5
24" swing, 120" cc, Heavy Duty . . . C12
24" swing, 120" cc . . . L5
24" swing, 120" cc . . . N14
24" swing, 120" cc, Trav. Table Type . . . N14
24" swing, 144" cc . . . C12
24" swing, 144" cc, Heavy Duty . . . C12
24" swing, 144" cc . . . L5
24" swing, 144" cc . . . N14
24" swing, 144" cc, Trav. Table Type . . . N14
24" swing, 168" cc . . . C12
24" swing, 168" cc, Heavy Duty . . . C12
24" swing, 168" cc . . . L5
24" swing, 168" cc . . . N14
24" swing, 168" cc, Trav. Table Type . . . N14
24" swing, 192" cc . . . C12
24" swing, 192" cc, Heavy Duty . . . C12
24" swing, 192" cc . . . L5
24" swing, 192" cc . . . N14
24" swing, 192" cc, Trav. Table Type . . . N14
24" swing, 216" cc . . . C12
24" swing, 216" cc . . . L5
24" swing, 216" cc . . . N14
24" swing, 240" cc . . . C12
24" swing, 240" cc . . . L5
24" swing, 240" cc . . . N14
28" swing, 96" cc . . . L5
28" swing, 96" cc, Heavy Duty . . . C12
28" swing, 96" cc, Trav. Table Type . . . N14
28" swing, 120" cc, Heavy Duty . . . C12
28" swing, 120" cc . . . L5
28" swing, 120" cc, Trav. Table Type . . . N14
28" swing, 144" cc, Heavy Duty . . . C12
28" swing, 144" cc . . . L5
28" swing, 144" cc, Trav. Table Type . . . N14
28" swing, 168" cc, Heavy Duty . . . C12
28" swing, 168" cc . . . L5
28" swing, 168" cc, Trav. Table Type . . . N14
28" swing, 192" cc, Heavy Duty . . . C12
28" swing, 192" cc . . . L5
28" swing, 192" cc, Trav. Table Type . . . N14
30" swing, 36" cc . . . L5
30" swing, 48" cc . . . L5
30" swing, 48" cc . . . N14
30" swing, 72" cc . . . L5
30" swing, 72" cc . . . N14
30" swing, 96" cc . . . L5
30" swing, 96" cc . . . N14
30" swing, 120" cc . . . L5
30" swing, 120" cc . . . N14
30" swing, 144" cc . . . L5
30" swing, 144" cc . . . N14
30" swing, 168" cc . . . L5
30" swing, 168" cc . . . N14
32" swing, 96" cc, Trav. Table Type . . . N14
32" swing, 120" cc, Trav. Table Type . . . N14
32" swing, 144" cc, Trav. Table Type . . . N14
32" swing, 168" cc, Trav. Table Type . . . N14
32" swing, 192" cc, Trav. Table Type . . . N14
36" swing, 48" cc . . . L5
36" swing, 72" cc . . . L5
36" swing, 96" cc . . . L5
36" swing, 96" cc, Trav. Table Type . . . N14
36" swing, 120" cc . . . L5
36" swing, 120" cc, Trav. Table Type . . . N14
36" swing, 144" cc, Trav. Table Type . . . N14
36" swing, 168" cc, Trav. Table Type . . . N14
36" swing, 192" cc, Trav. Table Type . . . N14
48" swing, 48" cc . . . L5
48" swing, 72" cc . . . L5
48" swing, 96" cc . . . L5
48" swing, 120" cc . . . L5
Full-Automatic . . . V2

Universal

8" swing, 8½" cc . . . R11
8" swing, 10" cc, Bench . . . C52
10" swing, 16" cc, Bench . . . C52
10" swing, 18" cc, Bench . . . B44
10" swing, 20" cc . . . L5
10" swing, 20" cc . . . N14
10" swing, 20" cc . . . C12
10" swing, 24" cc . . . L5
10" swing, 24" cc . . . R11
12" swing, 24" cc . . . L5
12" swing, 28" cc . . . C12
12" swing, 36" cc . . . L5
12" swing, 36" cc . . . N14
12" swing, 36" cc . . . T7
12" swing, 36" cc . . . C12
12" swing, 48" cc . . . L5
12" swing, 48" cc . . . N14
12" swing, 48" cc . . . C12
12" swing, 72" cc . . . N14
12" swing, 72" cc . . . R11
14" swing, 24" cc . . . B44
14" swing, 30" cc . . . C12
14" swing, 36" cc . . . L5
14" swing, 36" cc . . . N14
14" swing, 36" cc . . . B44
14" swing, 40" cc . . . C12
14" swing, 48" cc . . . L5
14" swing, 48" cc . . . N14
14" swing, 60" cc . . . C12
14" swing, 72" cc . . . L5
14" swing, 72" cc . . . N14
14" swing, 72" cc . . . N14
16" swing, 36" cc . . . N14
16" swing, 48" cc . . . N14
16" swing, 72" cc . . . C12
18" swing, 36" cc . . . L5
18" swing, 36" cc . . . C12
18" swing, 48" cc . . . L5
18" swing, 48" cc . . . C12
18" swing, 72" cc . . . L5
18" swing, 72" cc . . . R11
20" swing, 24" cc . . . L5
30" swing, 48" cc . . . L5
30" swing, 72" cc . . . L5
30" swing, 96" cc . . . L5
30" swing, 120" cc . . . L5
36" swing, 48" cc . . . L5
36" swing, 72" cc . . . L5
48" swing, 72" cc . . . L5
48" swing, 120" cc . . . L5

Roll Grinders, Traveling Table

10" swing, 48" cc . . . L5
10" swing, 72" cc . . . L5
16" swing, 48" cc . . . C12
16" swing, 48" cc . . . N14
16" swing, 72" cc . . . C12
16" swing, 72" cc . . . N14
16" swing, 96" cc . . . C12
16" swing, 96" cc . . . N14
16" swing, 120" cc . . . C12
16" swing, 120" cc . . . N14
16" swing, 144" cc . . . C12
16" swing, 144" cc . . . N14
16" swing, 168" cc . . . C12
16" swing, 168" cc . . . N14
18" swing, 72" cc . . . L5
18" swing, 96" cc . . . L5
18" swing, 120" cc . . . L5
18" swing, 144" cc . . . L5

(Code number following each listing indicates manufacturer, key on page 52)

External Cylindrical

Roll Grinders, Traveling Table

(Continued)

18" swing, 168" cc ... L5
18" swing, 192" cc ... L5
18" swing, 216" cc ... L5
18" swing, 240" cc ... L5
20" swing, 48" cc ... C12
20" swing, 48" cc ... N14
20" swing, 72" cc ... C12
20" swing, 72" cc ... N14
20" swing, 96" cc ... C12
20" swing, 96" cc ... N14
20" swing, 120" cc ... C12
20" swing, 120" cc ... N14
20" swing, 144" cc ... C12
20" swing, 144" cc ... N14
20" swing, 168" cc ... C12
20" swing, 168" cc ... N14
20" swing, 192" cc, Heavy Duty ... C12
20" swing, 192" cc ... N14
24" swing, 48" cc ... C12
24" swing, 48" cc ... N14
24" swing, 72" cc ... C12
24" swing, 72" cc ... L5
24" swing, 72" cc ... N14
24" swing, 96" cc ... C12
24" swing, 96" cc ... F3
24" swing, 96" cc ... L5
24" swing, 96" cc ... N14
24" swing, 120" cc ... C12
24" swing, 120" cc ... F3
24" swing, 120" cc ... L5
24" swing, 120" cc ... N14
24" swing, 144" cc ... C12
24" swing, 144" cc ... F3
24" swing, 144" cc ... L5
24" swing, 144" cc ... N14
24" swing, 168" cc ... C12
24" swing, 168" cc ... F3
24" swing, 168" cc ... L5
24" swing, 168" cc ... N14
24" swing, 192" cc, Heavy Duty ... C12
24" swing, 192" cc ... F3
24" swing, 192" cc ... L5
24" swing, 192" cc ... N14
24" swing, 216" cc ... F3
24" swing, 216" cc ... L5
24" swing, 240" cc ... L5
24" & 28" swing ... M18
28" swing, 96" cc, Heavy Duty ... C12
28" swing, 96" cc ... F3
28" swing, 96" cc ... N14
28" swing, 120" cc, Heavy Duty ... C12
28" swing, 120" cc ... F3
28" swing, 120" cc ... N14
28" swing, 144" cc, Heavy Duty ... C12
28" swing, 144" cc ... F3
28" swing, 144" cc ... N14
28" swing, 168" cc, Heavy Duty ... C12
28" swing, 168" cc ... F3
28" swing, 168" cc ... N14
28" swing, 192" cc, Heavy Duty ... C12
28" swing, 192" cc ... F3
28" swing, 192" cc ... N14
28" swing, 216" cc ... F3
32" swing, 96" cc ... F3
32" swing, 96" cc ... N14
32" swing, 120" cc ... F3
32" swing, 120" cc ... N14
32" swing, 144" cc ... F3
32" swing, 144" cc ... N14
32" swing, 168" cc ... F3
32" swing, 168" cc ... N14
32" swing, 192" cc ... F3
32" swing, 192" cc ... N14
32" swing, 216" cc ... F3
36" swing, 96" cc ... N14
36" swing, 120" cc ... N14
36" swing, 144" cc ... N14
36" swing, 168" cc ... N14
36" swing, 192" cc ... N14
42" swing, 72" cc, Jet Engine Components ... N14
48" swing, 72" cc, Jet Engine Components ... N14
53" swing, 72" cc, Jet Engine Components ... N14

Roll Grinders, Traveling Wheelhead

4" to 26" dia., 120" bed, Double Wheel ... L25
4" to 26" dia., 144" bed, Double Wheel ... L25
4" to 26" dia., 168" bed, Double Wheel ... L25
4" to 26" dia., 192" bed, Double Wheel ... L25
4" to 26" dia., 216" bed, Double Wheel ... L25
4" to 26" dia., 240" bed, Double Wheel ... L25
4" to 26" dia., 264" bed, Double Wheel ... L25
6" to 32" dia., 216" bed, Double Wheel ... L25
6" to 32" dia., 240" bed, Double Wheel ... L25
6" to 32" dia., 264" bed, Double Wheel ... L25
6" to 32" dia., 288" bed, Double Wheel ... L25
6" to 32" dia., 312" bed, Double Wheel ... L25
6" to 32" dia., 336 bed, Double Wheel ... L25
6" to 32" dia., 30' bed, Double Wheel ... L25
6" to 32" dia., 32' bed, Double Wheel ... L25
8" to 44" dia., 240" bed, Double Wheel ... L25
8" to 44" dia., 264" bed, Double Wheel ... L25
8" to 44" dia., 288" bed, Double Wheel ... L25
8" to 44" dia., 312" bed, Double Wheel ... L25
8" to 44" dia., 336" bed, Double Wheel ... L25
8" to 44" dia., 30' bed, Double Wheel ... L25
8" to 44" dia., 32' bed, Double Wheel ... L25
8" to 44" dia., 34' bed, Double Wheel ... L25
8" to 44" dia., 36' bed, Double Wheel ... L25
12" to 48" dia., 240" bed, Double Wheel ... L25
12" to 48" dia., 264" bed, Double Wheel ... L25
12" to 48" dia., 288" bed, Double Wheel ... L25
12" to 48" dia., 312" bed, Double Wheel ... L25
12" to 48" dia., 336" bed, Double Wheel ... L25
12" to 48" dia., 30' bed, Double Wheel ... L25
12" to 48" dia., 32' bed, Double Wheel ... L25
12" to 48" dia., 34' bed, Double Wheel ... L25
12" to 48" dia., 36' bed, Double Wheel ... L25
12" to 60" dia., 240" bed, Double Wheel ... L25
12" to 60" dia., 264" bed, Double Wheel ... L25
12" to 60" dia., 288" bed, Double Wheel ... L25
12" to 60" dia., 312" bed, Double Wheel ... L25
12" to 60" dia., 336" bed, Double Wheel ... L25
12" to 60" dia., 30' bed, Double Wheel ... L25
12" to 60" dia., 32' bed, Double Wheel ... L25
12" to 60" dia., 34' bed, Double Wheel ... L25
12" to 60" dia., 36' bed, Double Wheel ... L25
20" swing, 96" cc ... L5
20" swing, 120" cc ... L5
20" swing, 144" cc ... L5
20" swing, 168" cc ... L5
20" swing, 192" cc ... L5
24" swing, 96" cc ... F3
24" swing, 96" cc ... L5
24" swing, 120" cc ... F3
24" swing, 120" cc ... L5
24" swing, 144" cc ... F3
24" swing, 144" cc ... L5
24" swing, 144" cc ... F3
24" swing, 168" cc ... F3
24" swing, 168" cc ... L5
24" swing, 192" cc ... F3
24" swing, 192" cc ... L5
24" swing, 216" cc ... F3
26" x 72" with 80" dia. gap, Strut Components ... N14
26" x 96" with 80" dia. gap, Strut Components ... N14
28" swing, 96" cc ... F3
28" swing, 96" cc ... L5
28" swing, 120" cc ... F3
28" swing, 120" cc ... L5
28" swing, 144" cc ... F3
28" swing, 144" cc ... L5
28" swing, 168" cc ... F3
28" swing, 168" cc ... L5
28" swing, 192" cc ... F3
28" swing, 192" cc ... L5
28" swing, 216" cc ... F3
30" dia., length special, Single Wheel ... L25
32" x 72" with 86" dia. gap, Strut Components ... N14
32" x 96" with 86" dia. gap, Strut Components ... N14
32" x 102" with 86" dia. gap, Strut Components ... N14
36" swing, 120" cc ... C12
36" swing, 120" cc ... F3
36" swing, 120" cc ... L5
36" swing, 120" cc ... N14
36" swing, 144" cc ... C12
36" swing, 144" cc ... F3
36" swing, 144" cc ... L5
36" swing, 144" cc ... N14
36" swing, 168" cc ... C12
36" swing, 168" cc ... F3
36" swing, 168" cc ... L5
36" swing, 168" cc ... N14
36" swing, 192" cc ... C12
36" swing, 192" cc ... F3
36" swing, 192" cc ... L5
36" swing, 192" cc ... N14
36" swing, 216" cc ... C12
36" swing, 216" cc ... F3
36" swing, 216" cc ... L5
36" swing, 216" cc ... N14
36" swing, 240" cc ... C12
36" swing, 240" cc ... F3
36" swing, 240" cc ... L5
36" swing, 240" cc ... N14
36" dia., length special, Single Wheel ... L25
36" to 60" swing ... M18
41" swing, 144" cc ... C12
41" swing, 144" cc ... F3
41" swing, 144" cc ... L5
41" swing, 168" cc ... C12
41" swing, 168" cc ... F3
41" swing, 168" cc ... L5
41" swing, 192" cc ... C12
44" swing, 192" cc ... F3
44" swing, 192" cc ... L5
44" swing, 192" cc ... C12
44" swing, 216" cc ... F3
44" swing, 216" cc ... L5
44" swing, 240" cc ... C12
44" swing, 240" cc ... F3
44" swing, 240" cc ... L5
44" swing, 264" cc ... C12
44" swing, 264" cc ... F3
44" swing, 264" cc ... L5
44" swing, 288" cc ... C12
44" swing, 288" cc ... F3
44" swing, 288" cc ... L5
44" swing, 288" cc ... C12
50" swing, 144" cc ... F3
50" swing, 144" cc ... L5
50" swing, 144" cc ... C12
50" swing, 168" cc ... C12
50" swing, 168" cc ... F3
50" swing, 168" cc ... L5
50" swing, 192" cc ... C12
50" swing, 192" cc ... F3
50" swing, 192" cc ... L5
50" swing, 216" cc ... C12
50" swing, 216" cc ... F3
50" swing, 216" cc ... L5
50" swing, 240" cc ... C12
50" swing, 240" cc ... F3
50" swing, 240" cc ... L5
50" swing, 264" cc ... C12
50" swing, 264" cc ... F3
50" swing, 264" cc ... L5
50" swing, 288" cc ... C12
50" swing, 288" cc ... F3
50" swing, 288" cc ... L5
50" dia., length special, Single Wheel ... L25
60" swing, 144" cc ... C12
60" swing, 144" cc ... F3
60" swing, 144" cc ... L5
60" swing, 168" cc ... C12
60" swing, 168" cc ... F3
60" swing, 168" cc ... L5
60" swing, 192" cc ... C12
60" swing, 192" cc ... F3
60" swing, 192" cc ... L5
60" swing, 216" cc ... C12
60" swing, 216" cc ... F3
60" swing, 216" cc ... L5
60" swing, 240" cc ... C12
60" swing, 240" cc ... F3
60" swing, 240" cc ... L5
60" swing, 264" cc ... C12
60" swing, 264" cc ... F3
60" swing, 264" cc ... L5
60" swing, 288" cc ... C12
60" swing, 288" cc ... F3
60" swing, 288" cc ... L5
60" dia., length special, Single Wheel ... L25

External Cylindrical Not Elsewhere Classified

5" swing, Piston ... L5
5" swing, 26" cc, Cam Contour ... L5
5" swing, 26" cc, Cam ... N14
5" swing, 30" cc, Cam Contour ... L5
5" swing, 30" cc, Cam ... N14
5" swing, 40" cc, Cam Contour ... L5
5" swing, 40" cc, Cam ... N14
6" swing, 8" cc, Piston, Semiautomatic ... N14
10" swing, 16" cc, Crank Pin ... L5
10" swing, 18" cc, Crank Pin, Double Head ... N14
10" swing, 24" cc, Crank Pin, Double Head ... N14
10" swing, 30" cc, Grinding Machine, Multiple Wheel ... L5
10" swing, 30" cc, Multi-Wheel ... N14
10" swing, 34" cc, Crank Pin ... L5
10" swing, 36" cc, Two Wheel Slide ... N14
14" swing, 48" cc, Crankshaft ... L18
14" swing, 32" cc, Crank Pin ... L5
16" swing, 36" cc, Gap Type, Piston Rod ... N14
16" swing, 40" cc, Grinding Machine, Multiple Wheel ... L5
16" swing, 42" cc, Crank Pin ... L5
16" swing, 48" cc, Gap Type, Piston Rod ... N14
16" swing, 72" cc, Crank Pin ... L5
16" swing, 96" cc, Gap Type, Piston Rod ... N14
16" swing, 120" cc, Gap Type, Piston Rod ... N14
16" swing, 144" cc, Gap Type, Piston Rod ... N14
17" swing, 32" cc, Crank Pin, Double Head ... N14
17" swing, 42" cc, Crank Pin, Double Head ... N14
17" swing, 62" cc, Crank Pin, Double Head ... N14
17" swing, 72" cc, Crank Pin, Double Head ... N14
18" swing, 30" cc, Crank Pin, Regrinding ... L5

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

External Cylindrical

External Cylindrical Not Elsewhere
(Continued)

18" swing, 42" cc, Crank Pin—Regrinding..L5
18" swing, 66" cc, Crank Pin—Regrinding..L5
18"-42" swing, 96" cc, Gap ..L5
18"-42" swing, 120" cc, Gap ..L5
18"-42" swing, 144" cc, Gap ..L5
18"-42" swing, 168" cc, Gap ..L5
20" swing, 50" cc, Crankshaft ..L18
22" swing, 72" cc, Crankshaft ..L18
22" swing, 76" cc, Crank Pin—Regrinding..L5
22" swing, 84" cc, Crankshaft ..L18
22" swing, 88" cc, Crank Pin—Regrinding..L5
22" swing, 108" cc, Crankshaft ..L18
25" swing, 32" cc, Crank Pin ..L5
25" swing, 42" cc, Crank Pin ..L5
25" swing, 72" cc, Crank Pin ..L5
25" swing, 48" cc, Crank Pin ..L5
25" swing, 80" cc, Crank Pin ..L5
25" swing, 96" cc, Crank Pin ..L5
25" swing, 120" cc, Crank Pin ..L5
32" swing, 108" cc, Crankshaft ..L18
36" swing, 168" cc, Crankshaft ..L18
40" swing, 168" cc, Crankshaft ..L18
42" swing, Jet Engine Compressor Rotor ..N14
50" swing, 216" cc, Crankshaft ..L18
Jet Engine Compound Contour Blade ..N14
Vertical Propellor ..N14
$\frac{7}{8}$" to 3$\frac{1}{2}$" Head O.D., Valve Seats ..N14
32" dia., 12" travel, Cam Grinder ..R19

Centerless Hand Feed

0" to $\frac{1}{2}$" work dia. ..C12
0" to 4$\frac{3}{8}$" work dia. ..C12
$\frac{1}{4}$" to 4" dia. cap., Centerless ..P21
$\frac{1}{4}$" to 6" work dia. ..C12
$\frac{1}{2}$" to 9" work dia. ..C12
1" to 6" dia. cap., Centerless ..P21
1" to 7" work dia. ..C12
1" to 7" work dia. ..L5

Internal Cylindrical

Hand Feed

3" dia., 4" long ..R11
9" swing, 3$\frac{1}{2}$" max. depth hole ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, 2 spindle ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, Tool Room ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, Angular Wheel-Slide ..B45
10" swing, 12" stroke ..P2
10" swing, 12" table travel ..P2
10" swing, 24" table travel ..P2
10" swing, 30" table travel ..P2
16" to 44" hole capacity ..S28
72" dia. table ..M8
84" dia. table ..M8

Mechanical Feed

3" dia., 4" long ..R11
9" swing, 3$\frac{1}{2}$" max. depth hole ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, 2 spindle ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, Tool Room ..B45
9" swing, 3$\frac{1}{2}$" max. depth hole, Angular Wheel-Slide ..B45
10" swing, 12" stroke ..P2
10" swing, 12" table travel ..P2
10" swing, 24" table travel ..P2
10" swing, 30" table travel ..P2
16" to 44" hole capacity ..S28
72" dia. table ..M8
84" dia. table ..M8

Hydraulic Feed

9" swing, 9$\frac{1}{4}$" cc ..A20
9" dia., 6" long ..R11
16" swing, 9" max. depth hole ..B45
16" swing, 9" max. depth hole, Two Wheelhead ..B45
16" swing, 11" max. depth hole ..B45
16" swing, 12" max. depth hole, Swiveling Workhead Base ..B45
26" swing, 12" max. depth hole ..B45
60" swing, 16" max. depth hole ..B45
40" swing, 48" max. depth hole ..B45

Automatic Sizing

9" swing, 3" max. depth hole ..B45
16" to 44" hole capacity ..S28
16" swing, 9" max. depth hole ..B45
30" swing, 16" stroke, 24" dia. table, Universal Vertical ..F17

Combination Hole & Face

2$\frac{3}{4}$" dia. ..H13
8" swing, 12" table travel ..H13
9" swing, 1$\frac{5}{8}$" max. depth hole ..B45
10" swing, 32" table travel ..H13
12" dia., 13" long ..H13
12" swing, 16" table travel ..H13
12" swing, 30$\frac{3}{4}$" table travel ..H13
14$\frac{1}{2}$" swing, 15" table travel ..H13
16" to 44" hole capacity ..S28
16" swing, 16" table travel ..H13
16" swing, 30$\frac{3}{4}$" table travel ..H13
17$\frac{3}{4}$" swing, 32" table travel, Planetary Head ..H13
18" swing, 30$\frac{3}{4}$" table travel ..H13
24" swing, 32" table travel ..H13
24" swing, 41" table travel ..H13
36" swing, 22" table travel ..H13
42" swing, 22" table travel ..H13

Centerless

4" dia. ..H13
8" dia. ..H13
13" dia. ..H13
26" dia. ..H13

Surface Grinders, Rotary Table Type

Horizontal Spindle, Standard

6" dia. ..T2
7" dia. table, 5" spindle travel ..P2
8$\frac{1}{2}$" dia. table, Mechanical ..A20
9" dia. ..P2
12" dia. table ..H13
13" dia. table, Mechanical ..A20
16" dia. table ..H13
17" dia. table, Mechanical ..A20
21" dia. table, Hydraulic ..A20
24" dia. table ..H13
25" dia. table, Hydraulic ..A20
30" dia. table ..H13
31" dia. table, Hydraulic ..A20
40" dia. table, Hydraulic ..A20

Vertical Single Spindle

12" dia. table ..T7
12" dia. table ..W5
16" dia. mag. chuck ..B27
24" dia. table ..T7
30" dia. mag. chuck ..B27
30" dia. table ..M8
36" dia. mag. chuck ..B27
36" dia. table ..M8
40" dia. table ..M8
42" dia. mag. chuck ..B27
48" dia. mag. chuck ..B27
48" dia. table ..M8
60" dia. mag. chuck ..B27
72" dia. mag. chuck ..B27
72" dia. table ..M8
72"-84" dia. mag. chuck ..B27
84" dia. table ..M8

Vertical Multiple Spindle

2-30" dia. table, 2 Tables ..M8
30" dia. table, 60" swing, Universal Internal, External, Surface ..F17
36" dia. table, 60" swing, Universal Internal, External, Surface ..F17
36" dia. table ..M8
36" dia. table, 2 spindle ..M8
40" dia. table ..M8
40" dia. table, 2 spindle ..M8
42" dia. table, 60" swing, Universal Internal, External, Surface ..F17
43" dia. table, 2 spindle ..M8
48" dia. table, 60" swing, Universal Internal, External, Surface ..F17
60" dia. table, 72" swing, Universal Internal, External, Surface ..F17
72" dia. table, 88" swing, Universal Internal, External, Surface ..F17
72" dia. table, 3 or 4 spindle ..M8
100" dia. table, 120" swing, Universal Internal, External, Surface ..F17
100" dia. table, 5 spindle ..M8
120" dia. table, 130" swing, Universal Internal, External, Surface ..F17
130" dia. table, 140" swing, Universal Internal, External, Surface ..F17
140" dia. table, 150" swing, Universal Internal, External, Surface ..F17
1, 2, 3, 4, 5 spindles, Automatic ..B27

Surface Grinders, Reciprocating Table Type

Horizontal Spindle, Hand Feed

1" x 8" ..C48
1" x 8" x 6", Bench ..S1
5" wide, 12" long ..G1
5$\frac{1}{2}$" wide, 12" long ..B34
6" wide, 12" long ..C52
6" wide, 12" long ..T9
6" x 12" x 10$\frac{1}{2}$" cap. ..L5
6" wide, 13$\frac{1}{2}$" long ..B6
6" wide, 18" long ..B34
6" wide, 18" long ..B44
6" wide, 18" long ..C43
6" wide, 18" long ..F9
6" wide, 18" long ..G1
6" wide, 18" long ..P2
6" wide, 18" long ..R6
8" x 12" x 12", Bench ..S1
8" wide, 24" long ..A2
8" wide, 24" long, Hydraulic Type ..B44
10" wide, 15" long ..A2
12" wide, 18" long ..A2
9" table travel, Bench ..H11

Horizontal Spindle, Power Feed

5" wide, 12" long ..T2
6" wide, 18" long ..B44
6" wide, 18" long ..C43
6" wide, 18" long ..G1
6" wide, 18" long ..N14
6" wide, 18" long ..R6
6" wide, 18" long ..T7
6" wide, 18" long, Tool Room Type ..T7

(Code number following each listing indicates manufacturer, key on page 82)

Surface Grinders, Reciprocating Table Type

Horizontal Spindle, Power Feed

(Continued)

6½" wide, 19¾" long D17
6½" wide, 24" long D17
8" wide, 18" long T7
8" wide, 24" long B44
8" wide, 24" long C43
8" wide, 24" long G1
8" wide, 24" long N14
8" wide, 24" long T7
8" wide, 24" long, Tool Room Type T7
8½" wide, 24" long D17
9" wide, 36" long T7
9" wide, 40" long T7
9" wide, 56" long T7
9" wide, 60" long T7
10" wide, 20" long T7
10" wide, 24" long T7
10" wide, 24" long N14
10" wide, 36" long D17
10" wide, 36" long N14
10" wide, 48" long N14
10" wide, 60" long N14
12" wide, 20" long T7
12" wide, 24" long G1
12" wide, 24" long T7
12" wide, 36" long G1
12" wide, 36" long M8
12" wide, 36" long T7
12" wide, 40" long T7
12" wide, 44" long T7
12" wide, 38" long G1
12" wide, 48" long M8
12" wide, 48" long T7
12" wide, 56" long T7
12" wide, 60" long G1
12" wide, 60" long M8
12" wide, 60" long T7
12" wide, 72" long G1
12" wide, 72" long M8
12" wide, 72" long T7
12" wide, 84" long T7
12" wide, 96" long T7
12" wide, 120" long T7
14" wide, 24" long G1
14" wide, 36" long G1
14" wide, 36" long M8
14" wide, 36" long T7
14" wide, 40" long T7
14" wide, 44" long T7
14" wide, 48" long G1
14" wide, 48" long M8
14" wide, 48" long T7
14" wide, 56" long T7
14" wide, 60" long G1
14" wide, 60" long M8
14" wide, 60" long T7
14" wide, 72" long G1
14" wide, 72" long M8
14" wide, 72" long T7
16" wide, 24" long G1
16" wide, 36" long G1
16" wide, 40" long T7
16" wide, 48" long G1
16" wide, 48" long M8
16" wide, 48" long T7
16" wide, 60" long G1
16" wide, 60" long M8
16" wide, 60" long T7
16" wide, 72" long G1
16" wide, 72" long M8
16" wide, 72" long T7
16" wide, 96" long G1
16" wide, 96" long M8
16" wide, 96" long T7
16" wide, 120" long M8
16" wide, 120" long T7
16" wide, 144" long M8
16" wide, 144" long T7
16" wide, 168" long M8
16" wide, 168" long T7
18" work, 6" width R12
18" wide, 48" long G1
18" wide, 48" long M8
18" wide, 48" long T7
18" wide, 48" long G1
18" wide, 60" long, Openside H20
18" wide, 60" long M8
18" wide, 60" long T7
18" wide, 72" long G1
18" wide, 72" long, Openside H20
18" wide, 72" long M8
18" wide, 72" long T7
18" wide, 84" long, Openside H20
18" wide, 96" long G1
18" wide, 96" long, Openside H20
18" wide, 96" long M8
18" wide, 96" long T7
18" wide, 120" long, Openside H20
18" wide, 120" long M8
18" wide, 120" long T7
18" wide, 132" long, Openside H20
18" wide, 144" long, Openside H20
18" wide, 144" long M8
18" wide, 144" long T7
18" wide, 156" long, Openside H20
18" wide, 168" long, Openside H20
18" wide, 168" long M8
18" wide, 168" long T7
18" wide, 180" long, Openside H20
18" wide, 192" long, Openside H20
18" wide, 204" long, Openside H20
18" wide, 216" long, Openside H20
18" wide, 228" long, Openside H20
18" wide, 240" long, Openside H20
20" wide, 48" long G1
20" wide, 48" long M8
20" wide, 48" long T7
20" wide, 60" long G1
20" wide, 60" long M8
20" wide, 60" long T7
20" wide, 72" long G1
20" wide, 72" long M8
20" wide, 72" long T7
20" wide, 96" long G1
20" wide, 96" long M8
20" wide, 96" long T7
20" wide, 120" long M8
20" wide, 120" long T7
20" wide, 144" long M8
20" wide, 144" long T7
20" wide, 168" long M8
20" wide, 168" long T7
24" wide, 48" long G1
24" wide, 48" long M8
24" wide, 48" long T7
24" wide, 60" long G1
24" wide, 60" long, Openside H20
24" wide, 60" long M8
24" wide, 60" long T7
24" wide, 72" long G1
24" wide, 72" long, Openside H20
24" wide, 72" long M8
24" wide, 72" long T7
24" wide, 84" long, Openside H20
24" wide, 96" long G1
24" wide, 96" long, Openside H20
24" wide, 96" long M8
24" wide, 96" long T7
24" wide, 108" long, Openside H20
24" wide, 120" long, Openside H20
24" wide, 120" long M8
24" wide, 120" long T7
24" wide, 132" long, Openside H20
24" wide, 144" long, Openside H20
24" wide, 144" long M8
24" wide, 144" long T7
24" wide, 156" long, Openside H20
24" wide, 168" long, Openside H20
24" wide, 168" long M8
24" wide, 168" long T7
24" wide, 180" long, Openside H20
24" wide, 192" long, Openside H20
24" wide, 204" long, Openside H20
24" wide, 216" long, Openside H20
24" wide, 228" long, Openside H20
24" wide, 240" long, Openside H20
30" wide, 60" long G1
30" wide, 60" long, Openside H20
30" wide, 72" long G1
30" wide, 72" long, Openside H20
30" wide, 72" long M8
30" wide, 72" long T7
30" wide, 84" long, Openside H20
30" wide, 96" long G1
30" wide, 96" long, Openside H20
30" wide, 96" long M8
30" wide, 96" long T7
30" wide, 108" long, Openside H20
30" wide, 120" long, Openside H20
30" wide, 120" long M8
30" wide, 120" long T7
30" wide, 132" long, Openside H20
30" wide, 144" long, Openside H20
30" wide, 144" long M8
30" wide, 144" long T7
30" wide, 156" long, Openside H20
30" wide, 168" long, Openside H20
30" wide, 168" long M8
30" wide, 168" long T7
30" wide, 180" long, Openside H20
30" wide, 192" long, Openside H20
30" wide, 192" long M8
30" wide, 192" long T7
30" wide, 204" long, Openside H20
30" wide, 216" long, Openside H20
30" wide, 228" long, Openside H20
30" wide, 240" long, Openside H20
30" wide, 240" long T7
36" wide, 60" long, Openside H20
36" wide, 72" long, Openside H20
36" wide, 72" long M8
36" wide, 72" long T7
36" wide, 84" long, Openside H20
36" wide, 96" long, Openside H20
36" wide, 96" long M8
36" wide, 96" long T7
36" wide, 108" long, Openside H20
36" wide, 120" long, Openside H20
36" wide, 120" long M8
36" wide, 120" long T7
36" wide, 132" long, Openside H20
36" wide, 144" long, Openside H20
36" wide, 144" long M8
36" wide, 144" long T7
36" wide, 156" long, Openside H20
36" wide, 168" long, Openside H20
36" wide, 168" long M8
36" wide, 168" long T7
36" wide, 180" long, Openside H20
36" wide, 192" long, Openside H20
36" wide, 192" long M8
36" wide, 192" long T7
36" wide, 204" long, Openside H20
36" wide, 216" long, Openside H20
36" wide, 228" long, Openside H20
36" wide, 240" long, Openside H20
36" wide, 240" long T7
48" wide, 96" long T7
48" wide, 120" long T7
48" wide, 144" long T7
48" wide, 168" long T7
48" wide, 192" long T7
48" wide, 240" long T7
60" wide, 120" long T7
60" wide, 144" long T7
60" wide, 168" long T7
60" wide, 192" long T7
60" wide, 240" long T7
72" wide, 120" long T7
72" wide, 144" long T7
72" wide, 168" long T7
72" wide, 192" long T7
72" wide, 240" long T7

Vertical Spindle

8" wide, 24" long A2
12" wide, 36" long T7
12" wide, 48" long T7
12" wide, 60" long T7
13" wide, 36" long M8
13" wide, 48" long M8
13" wide, 60" long M8
13" wide, 72" long M8
14" wide, 24" long P17
16" wide, 48" long T7
16" wide, 60" long T7
16" wide, 72" long T7
16" wide, 96" long T7
16" wide, 120" long T7
16" wide, 144" long T7
16" wide, 168" long T7
18" wide, 50" long M8
18" wide, 50" long T7
18" wide, 60" long, Openside H20
18" wide, 60" long M8
18" wide, 62" long T7
18" wide, 72" long, Openside H20
18" wide, 72" long M8
18" wide, 84" long, Openside H20
18" wide, 86" long M8
18" wide, 86" long T7
18" wide, 88" long P17
18" wide, 96" long, Openside H20
18" wide, 96" long M8
18" wide, 102" long M8
18" wide, 102" long T7
18" wide, 108" long, Openside H20
18" wide, 120" long M8
18" wide, 120" long, Openside H20
18" wide, 120" long T7
18" wide, 132" long, Openside H20
18" wide, 132" long T7
18" wide, 144" long, Openside H20
18" wide, 144" long M8
18" wide, 156" long, Openside H20
18" wide, 168" long, Openside H20
18" wide, 168" long M8
18" wide, 180" long, Openside H20
18" wide, 190" long T7
18" wide, 192" long, Openside H20
18" wide, 192" long M8
18" wide, 204" long, Openside H20
18" wide, 216" long, Openside H20
18" wide, 216" long M8
18" wide, 228" long, Openside H20
18" wide, 228" long M8
18" wide, 240" long, Openside H20
18" wide, 240" long M8
18" wide, 360" long M8
20" wide, 48" long T7
20" wide, 60" long T7
20" wide, 72" long T7
20" wide, 96" long T7
20" wide, 120" long T7
20" wide, 144" long T7
20" wide, 168" long T7

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Surface Grinders, Reciprocating Table Type

Vertical Spindle

(Continued)

24" wide, 48" long ... T7
24" wide, 60" long, Openside ... H20
24" wide, 60" long ... T7
24" wide, 72" long, Openside ... H20
24" wide, 72" long ... T7
24" wide, 84" long, Openside ... H20
24" wide, 96" long, Openside ... H20
24" wide, 96" long ... T7
24" wide, 108" long, Openside ... H20
24" wide, 120" long, Openside ... H20
24" wide, 120" long ... T7
24" wide, 132" long, Openside ... H20
24" wide, 144" long, Openside ... H20
24" wide, 144" long ... T7
24" wide, 156" long, Openside ... H20
24" wide, 168" long, Openside ... H20
24" wide, 168" long ... T7
24" wide, 180" long, Openside ... H20
24" wide, 192" long, Openside ... H20
24" wide, 204" long, Openside ... H20
24" wide, 216" long, Openside ... H20
24" wide, 228" long, Openside ... H20
24" wide, 240" long, Openside ... H20
28" wide, 50" long ... M8
28" wide, 60" long ... M8
28" wide, 60" long ... T7
28" wide, 72" long ... M8
28" wide, 86" long ... M8
28" wide, 86" long ... T7
28" wide, 96" long ... M8
28" wide, 102" long ... M8
28" wide, 102" long ... T7
28" wide, 120" long ... M8
28" wide, 120" long ... T7
28" wide, 144" long ... M8
28" wide, 168" long ... M8
28" wide, 192" long ... M8
28" wide, 216" long ... M8
28" wide, 240" long ... M8
30" wide, 60" long, Openside ... H20
30" wide, 72" long, Openside ... H20
30" wide, 72" long ... T7
30" wide, 84" long, Openside ... H20
30" wide, 96" long, Openside ... H20
30" wide, 96" long ... T7
30" wide, 108" long, Openside ... H20
30" wide, 120" long, Openside ... H20
30" wide, 120" long ... T7
30" wide, 132" long, Openside ... H20
30" wide, 144" long, Openside ... H20
30" wide, 144" long ... T7
30" wide, 156" long, Openside ... H20
30" wide, 168" long, Openside ... H20
30" wide, 168" long ... T7
30" wide, 180" long, Openside ... H20
30" wide, 192" long, Openside ... H20
30" wide, 192" long ... T7
30" wide, 204" long, Openside ... H20
30" wide, 216" long, Openside ... H20
30" wide, 228" long, Openside ... H20
30" wide, 240" long, Openside ... H20
36" wide, 72" long ... T7
36" wide, 96" long ... T7
36" wide, 120" long ... T7
36" wide, 144" long ... T7
36" wide, 168" long ... T7
36" wide, 192" long ... T7
48" wide, 72" long ... T7
48" wide, 96" long ... T7
48" wide, 120" long ... T7
48" wide, 144" long ... T7
48" wide, 168" long ... T7

Vertical Spindle Rail Type

30" wide, 72" long ... M8
30" wide, 96" long ... M8
30" wide, 120" long ... M8
30" wide, 144" long ... M8
30" wide, 168" long ... M8
30" wide, 192" long ... M8
30" wide, 216" long ... M8
30" wide, 240" long ... M8
36" wide, 72" long ... M8
36" wide, 96" long ... M8
36" wide, 120" long ... M8
36" wide, 144" long ... M8
36" wide, 168" long ... M8
36" wide, 192" long ... M8
36" wide, 216" long ... M8
36" wide, 240" long ... M8
48" wide, 72" long ... M8
48" wide, 96" long ... M8
48" wide, 120" long ... M8
48" wide, 144" long ... M8
48" wide, 168" long ... M8
48" wide, 192" long ... M8
48" wide, 216" long ... M8
48" wide, 240" long ... M8
50" wide, 72" long ... M8
50" wide, 96" long ... M8
50" wide, 120" long ... M8
50" wide, 144" long ... M8
50" wide, 168" long ... M8
50" wide, 192" long ... M8
50" wide, 216" long ... M8
50" wide, 240" long ... M8

Horizontal Spindle Rail Type

30" wide, 72" long ... M8
30" wide, 96" long ... M8
30" wide, 120" long ... M8
30" wide, 144" long ... M8
30" wide, 168" long ... M8
30" wide, 192" long ... M8
30" wide, 216" long ... M8
30" wide, 240" long ... M8
36" wide, 72" long ... M8
36" wide, 96" long ... M8
36" wide, 120" long ... M8
36" wide, 144" long ... M8
36" wide, 168" long ... M8
36" wide, 192" long ... M8
36" wide, 216" long ... M8
36" wide, 240" long ... M8
50" wide, 72" long ... M8
50" wide, 96" long ... M8
50" wide, 120" long ... M8
50" wide, 144" long ... M8
50" wide, 168" long ... M8
50" wide, 192" long ... M8
50" wide, 216" long ... M8
50" wide, 240" long ... M8

Reciprocating Wheelhead Type

24" wide, 120" long ... T7
30" wide, 120" long ... T7
30" wide, 192" long ... T7
36" wide, 192" long ... T7
40" wide, 120" long ... T7
50" wide, 240" long ... T7
36" dia. wheel, 10" travel ... G2
20 hp-150 hp, Traveling Head Grinders ... M16

Disc Grinders

Horizontal Single Spindle, Hand Feed

12" dia. wheel, Face ... A2
16" dia. wheel ... M9
18" dia. wheel, Face ... A2
20" dia. wheel ... M9
30" dia. wheel ... M9

Horizontal Single Spindle, Power Feed

16" dia. wheel ... M8
20" dia. wheel ... G2
24" dia. wheel ... M8
26" dia. wheel ... G2

Horizontal Two Spindle Opposed, Hand Feed

12" dia. wheel ... G2
15" dia. wheel ... G2
18" dia. wheel ... G2
18" dia. wheel ... Q1
23" dia. wheel, Special ... G2
26" dia. wheel ... G2
26" dia. wheel ... Q1
30" dia. wheel ... G2
40" dia. wheel ... G2
53" dia. wheel ... G2
1" x 8" spring steel, Leaf Spring Eye ... C42

Horizontal Two Spindle Opposed, Power Feed

12" dia. wheel ... B16
12" dia. wheel ... M8
15" dia. wheel ... B16
16" dia. wheel ... M8
18" dia. wheel ... B16
20" dia. wheel ... B16
20" dia. wheel ... M8
23" dia. wheel ... B16
24" dia. wheel ... M8
26" dia. wheel ... B16
30" dia. wheel ... B16
30" dia. wheel ... M8
36" dia. wheel ... B16
42" dia. wheel ... B16
53" dia. wheel ... B16
72" dia. wheel ... B16

Horizontal Double End, Hand Feed

8" dia. wheel ... B36
8" dia. wheel ... B46
8" dia. wheel, Dry ... U4
10" dia. wheel ... B36
10" dia. wheel ... C9
10" dia. wheel ... S30
10" dia. wheel, Dry ... U4
12" dia. wheel ... B36
12" dia. wheel ... C9
12" dia. wheel ... H22
12" dia. wheel ... S30
12" dia. wheel, Dry ... U4
14" dia. wheel ... B36
14" dia. wheel ... C9
14" dia. wheel ... H22
14" dia. wheel ... S30
15" dia. wheel ... B16
16" dia. wheel ... M8
18" dia. wheel ... B16
18" dia. wheel ... B36
18" dia. wheel ... C9
18" dia. wheel ... G2
18" dia. wheel ... H22
18" dia. wheel ... S30
18" dia. wheel, Dry ... U4
20" dia. wheel ... B16
20" dia. wheel ... B36
20" dia. wheel ... C9
20" dia. wheel ... G2
20" dia. wheel ... H22
20" dia. wheel ... M8
20" dia. wheel ... S30
20" dia. wheel, Dry ... U4
23" dia. wheel ... B16
23" dia. wheel ... G2
24" dia. wheel ... M8
24" dia. wheel ... S30
24" dia. wheel, Dry ... U4
26" dia. wheel ... B16
26" dia. wheel, Dry ... U4
30" dia. wheel ... B16
30" dia. wheel ... G2
30" dia. wheel ... M8
30" dia. wheel ... S30
30" dia. wheel, Dry ... U4
36" dia. wheel ... B16
40" dia. wheel ... B16
40" dia. wheel ... G2
40" dia. wheel ... M8

Horizontal Double End, Power Feed

16" dia. wheel ... M8
20" dia. wheel ... M8
24" dia. wheel ... M8
30" dia. wheel ... M8
36" wheel, 86" table travel ... M8
36" wheel, 100" table travel ... M8
36" wheel, 130" table travel ... M8
36" wheel, 150" table travel ... M8
36" wheel, 170" table travel ... M8
36" wheel, 192" table travel ... M8
36" wheel, 240" table travel ... M8
40" dia. wheel ... M8
48" wheel, 86" table travel ... M8
48" wheel, 100" table travel ... M8
48" wheel, 130" table travel ... M8
48" wheel, 150" table travel ... M8
48" wheel, 170" table travel ... M8
48" wheel, 192" table travel ... M8
60" wheel, 86" table travel ... M8
60" wheel, 100" table travel ... M8
60" wheel, 130" table travel ... M8
60" wheel, 150" table travel ... M8
60" wheel, 170" table travel ... M8
60" wheel, 192" table travel ... M8

Vertical Single Spindle

6" dia. wheel, 10¾" dia. table, Radial Head, Wet ... B16
8" dia. wheel, 10¾" dia. table, Radial Head, Wet ... B16
8" dia. wheel, 16" dia. table, Radial Head, Wet ... B16
8" dia. wheel ... B46
10" dia. wheel, 16" dia. table, Radial Head, Wet ... B16
12" dia. wheel, 16" dia. table, Radial Head, Wet ... B16
14" dia. wheel, 22" dia. table, Radial Head, Wet ... B16
18" dia. wheel, 22" dia. table, Radial Head, Wet ... B16

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Disc Grinders

Vertical Single Spindle

(Continued)

14" dia. wheel, 24" x 50" table, Surface, Horizontal, Automotive Heads, Blocks L18
14" dia. wheel, 24" x 50" table, Surface P6
14" dia. wheel, 27" x 72" table, Surface P6
18" dia. wheel, Bench Type B16
26" dia. wheel, 42" dia. table, Radial Head, Wet B16
30" dia. wheel, Dry B16
30" dia. wheel, Wet B16
38" dia. wheel, Wet B16
38" dia. wheel G2
42" dia. wheel, Dry B16
42" dia. wheel, Wet B16
53" dia. wheel, Dry B16
53" dia. wheel G2
53" dia. wheel M8
72" dia. wheel, Wet B16
72" dia. wheel G2

Vertical Multip'e Spindle

15" dia. wheel, Eight Spindle, Automatic B1
16" dia. wheel, Double Spindle, Dry B16
16" dia. wheel, Double Spindle, Wet B16
18" dia. wheel, Double Spindle, Dry B16
18" dia. wheel, Double Spindle, Wet B16
18" dia. wheel, Double Spindle G2
20" dia. wheel, Double Spindle, Dry B16
20" dia. wheel, Double Spindle G2
26" dia. wheel, Double Spindle, Dry B16
30" dia. wheel, Double Spindle, Dry B16
30" dia. wheel, Double Spindle G2
40" dia. wheel, Double Spindle G2
42" dia. wheel, Double Spindle, Dry B16
53" dia. wheel, Double Spindle, Dry B16

Disc Grinders Not Elsewhere Classified

2½" x 60" belt, Floor M9
23" dia. wheel, Two Head Special G2
40" dia. wheel, Three Head Special G2

Thread Grinders

External

⅛" to 4¾" dia., Centerless I4
½" dia., 4" cc S9
3" dia., 8" cc D2
3" dia., 12" cc S9
3" dia., 24" cc S9
4" dia., 12" cc S9
6" dia., 15" cc J5
6" dia., 18" cc E19
6" dia., 36" cc E19
6" dia., 36" cc J5
10" dia., 24" cc S9
10" dia., 20" spindle H8
12" dia. 5" cc J5
12" dia., 45" cc J5
16" dia., 5" cc J5

External & Internal

8" dia., 18" cc E19
8" dia., 68" cc E19
12" dia., 48" cc E19
12" dia., 68" cc E19

Internal

1" to 9½" hole, 10" swing E19
Extra-long work pieces E19

Tool and Cutter Grinders

Universal

#0 to 3" B26
3⅜" swing, 28" cc N12
4" swing B20
4½" swing, 24" cc N12
5½" swing, 16¼" cc, Floor D6
6⅜" swing, 17½" cc B14
7" swing, 18" cc, Circular Relief G24
8" dia. wheel M38
8" swing, 15" cc O2
8¼" swing, 18⅜" cc L11
8" swing, 16" cc C43
8" swing, 24" cc B14
9" swing, 15" cc M27
9¼" swing, 20" cc G1
10" swing, 19¼" cc N14
10" swing, 20" cc B14
10" swing, 20" long G1
10" swing, 24" long G1
10" swing, 26" long G1
10" swing, 27" cc C12
10" swing, 28" cc L10
10⅜" swing, 24" cc C43
10⅜" swing, 30" cc C43
10½" swing, 26" cc G1
10⅜" swing, 20" cc M11
12" swing, 6" cc C12
12" swing, 24" long G1
12" swing, 24" cc G1
12" swing, 27" cc N14
12" swing, 28" long G1
12" swing, 28" cc G1
12" swing, 31⅜" cc N14
12" swing, 36" cc G1
15" swing, 16" stroke A2
Special, Cutterhead W20

Broach Grinders

32" cap., Surface C32
36" cap., Cylindrical C32
36" cap., Universal C32
36" cap. L7
44" cap., Surface C32
60" cap. L7
72" cap. L7
80" cap. L7
84" cap., Cylindrical C32
84" cap., Universal C32
6" wide, 48" long T7
6" dia., 48" long, Round Broaches Only T7
6" dia., 60" long, Universal, Round and Flat A13
6" wide, 60" long T7
6" dia., 60" long, Round Broaches Only T7
6" wide, 72" long T7
6" dia., 72" long, Round Broaches Only T7
6" dia., 84" long, Universal, Round and Flat A13
9" dia. 60" long, Round A13
9" dia. 84" long, Round A13
12" wide, 48" long T7
12" wide, 60" long T7
12" wide, 72" long T7

Drill Grinders

#70 to #1" B26
#60 to #1" B26
⅛" to ½" B26
#52 to ⅜" dia G1
#52 to 1½" dia G1
#52 to 2½" dia G1
#52 to 4" dia G1
⅛" to ½" B26
⅛" to ⅝" B26
⅛" to 1¼" dia G1
⅛" to 2½" dia G1
⅛" to 4" dia G1
⅛" to 5" dia G1
#30 to ⅝" dia. drill, Bench C43
#30 to 1½" dia. drill, Floor C43
#30 to 2½" dia. drill, Floor C43
#30 to 4" dia. drill, Floor C43
¼" to ⅝" B26
¼" to 1½" dia. drill, Bench C43
¼" to 1½" dia. drill, Floor C43
¼" to 2½" dia G1
¼" taps, 2½" drills, Drill Point Thinner G1
¼" to 4" dia. drill, Floor C43
#1" dia. drill B24
⅝" drill W21
⅝" to 2½" dia. drill, Floor C43
½" drill O2
½" dia. drill B24
½" to 4" dia G1
½" taps, 4" drills, Drill Point Thinner G1
½" to 4" dia. drill, Floor C43
⅜" dia. drill B24
1¼" drill W21
2½" drill W21
3" drill O2
3" dia. drills, Drill Point Thinner O2
½ hp B43
Special C36
Special, Drill Point Thinning C36

Single Point Tool Grinders

1½" wide, 1⅜" high O2
4" dia. wheel, Carbide Tool, Chip Breaker, Bench H5
4" dia. wheel, Carbide Tool, Chip Breaker, Floor H5
6" dia. wheel, Carbide A20
6" dia. wheel, Carbide B3
6" dia. ½ hp, Bench & Pedestal, Double End B43
6" dia. wheel, Carbide, Bench D6
6" dia. wheel, Carbide Pedestal D6
6" dia. wheel, 7½" x 12" table, Carbide, Double End E19
6" dia. wheel 9" x 16" table, Carbide Double End E19
6" dia. wheel, Carbide Tool H5
6" dia. wheel, Carbide Tool, Double End H5
6" dia. wheel Chip Breaker & Diamond Finishing, Double End H5
6" dia. wheel Chip Breaker & Diamond Finishing Comb., Floor H5
6" dia. wheel, Chip Breaker & Carbide Tool Comb., Double End H5
6" dia. wheel, Carbide Breaker & Carbide Tool Combination H5
6" dia. wheel, Chip Breaker L11
6" dia. wheel Carbide Tool L11
7" dia. wheel N14
7" vitrified wheels, 6" or 7" diamond wheels, Carbide Tool, Bench P24
7" vitrified wheels, 6" or 7" diamond wheels, Carbide Tool, Floor P24
7" vitrified wheels, 6" or 7" diamond wheels, Carbide Tool, Wet, Floor P24
7" vitrified wheels, 6" or 7" diamond wheels, Precision, Bench Type P24
7" vitrified wheels, 6" or 7" diamond wheels, Precision, Floor Type P24
7" vitrified wheels, 6" or 7" diamond wheels, Precision, Wet, Floor P24
10" dia. wheel, Carbide Tool H5
10" dia. wheel 9" x 16" table, Carbide, Double End E19
10" dia. wheel, Carbide Tool, Double End H5
10" dia. wheel S30
12" dia. wheel, Carbide Tool B36
13½" length, 6" width, Chip Breaker D6
14" dia. wheel, 9" x 22" table, Carbide, Double End, Dry E19
14" dia. wheel, 9" x 22" table, Carbide, Double End, Wet E19
14" dia. wheel, Carbide Tool H5
14" dia. wheel, Carbide Tool, Double End H5
14" dia. wheel S30
20" dia. wheel S30
Special C36

Shear & Knife Grinders

up to 12" blade, Cutlery P13
12" wide, 60" long H20
12" dia. Maximum, Knife, Circular B25
18" dia. Maximum, Knife, Circular B25
30" length, blade W20
32" length, blade H6
38" length, blade H6
38" Knife Y1
42" length, blade W20
48" length, blade H6
52" length, blade M8

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Tool and Cutter Grinders

Shear and Knife Grinders

(Continued)

54" length blade H6
60" length blade H6
60" length blade M8
66" length blade H6
72" long, 12" wide H20
76" length blade H6
84" length blade H6
84" long, 12" wide H20
86" length blade M8
90" length blade H6
94" length blade M8
96" length blade H6
96" long, 12" wide H20
100" length blade H6
102" length blade M8
108" length blade H6
108" long, 12" wide H20
120" length blade H6
120" length blade M8
120" long, 12" wide H20
130" length blade H6
132" length blade M8
132" long, 12" wide H20
144" long, 12" wide H20
150" length blade H6
152" length blade M8
156" long, 12" wide H20
160" length blade M8
162" length blade M8
168" long, 12" wide H20
170" length blade H6
180" length blade H6
180" long, 12" wide H20
180" length blade M8
184" length blade H6
192" long, 12" wide H20
192" length blade M8
196" length blade H6
204" long, 12" wide H20
210" length blade M8
216" long, 12" wide H20
224" length blade H6
228" long, 12" wide H20
230" length blade M8
240" long, 12" wide H20
248" length blade H6
260" length blade H6
284" length blade H6
296" length blade H6

Face Mill Grinders

6" to 18" dia. O2
6" to 26" dia. O2
10" to 21" dia. O2
20" dia. K4

Saw Grinders

⅛"-2½" drills M11
⅝" to 2" wide, Hack Saw & Band Saw P4
1" to 6" width blade, Band Resaw H6
2" to 8" width blade, Band Resaw H6
4" to 16" width blade, Band Saw H6
4" to 14" width blade, Band Saw H6
5" to 60" dia., Circular Floor M9
6" to 28" dia. blade, Circular Saw H6
8" to 24" dia. blade H6
8" to 30" dia. blade, Circular Saw H6
8" to 48" dia. blade, Circular Saw H6
8" to 54" dia. blade, Circular Saw H6
10" to 16" width blade, Band Saw H6
18" dia. saw M37
22" dia., Saw and Knife, Circular B24
24" to 72" dia. blade, Circular Saw H6
24" to 108" dia. blade, Circular Saw H6
28" vise, Floor M9
28" vise, Bench M9
32" dia. blade, Gang Saw H6
32" dia. blade C30
40" dia., Circular Saw E17
42" dia. blade C30
45" dia. saw M37
48" dia., Circular Saw E17
72" dia. blade, Gang Saw H6
84" dia., Circular Saw E17
108" dia. saw M37
Special, Chaser Grinders C36

Miscellaneous Special Tool Grinders

⅛" to 3" dia., Tool & Tap G1
⅜" to 3" tap, ⅜" to 1½" drill, Drill & Tap G1
⅜" to 3" tap, ¼" to 2½" drill, Drill & Tap G1
#6 to 1½" tap, ⅛" to 1½" drill, Drill & Tap G1
#6 to 1½" tap, #52 to ¾" drill, Drill & Tap G1
#6 to 1½" dia., Tool & Tap G1
#6 to 3" dia., Tap G1
#0 to ⅝", Flute B26
#0 to 1⅜", Flute B26
#0 to 2", 6" long, Chamfer, Tap B26
#0 to 2", 14" long, Chamfer, Tap B26
¼" to 1¼" Hook Tapper, Taps, Tap, Floor Type B32
to 1½" hand taps, Tap, Floor Type B32
⅜" to 3" dia., Tap G1
1½" taps, ¾" drills, Twist Drill & Tap G1
1½" taps, 1½" drills, Twist Drill & Tap G1
3" taps, 1½" drills, Twist Drill & Tap G1
3" taps, 2½" drills, Twist Drill & Tap G1
2 hp. Bit B30
3 hp. Bit B30
½ hp. Grinder, Shank B30
1⅛" wide, Thread, Chaser, Pedestal Type L4
1⅝" wide, Thread, Chaser, Pedestal Type L4
1⅞" wide, Thread, Chaser, Floor Type L4
4" dia. wheel, Thread Chaser E1
4½" wide, Thread, Chaser, Floor Type L4
7¼" wide, Thread, Chaser, Floor Type L4
up to 8" chasers, Chaser & Cut-Off Wheel C37
2 Wheel, Tangent Chaser, Bench Type J5
12" table travel, Bench, Tool & Chaser N1
16" table travel, Floor, Tool & Chaser N1
up to ⅛" cap., Engraving Cutter N9
⅝" dia. cutter, Engraving Cutter G14
1" dia. cutter, Engraving Cutter G14
Engraving Cutter P18
3½", 18" dia., Gear Cutters, Spiral Bevel, Hypoid & Zerol G12
4½" dia. cutters, Gear Cutters, Straight Bevel G12
6" dia. cutters, Gear Cutters, Spiral Bevel, Hypoid & Zerol G12
6" P. D. helical cutters, Sharpening Machine, Gear Shaper Cutter, Helical F5
6" to 12" dia. cutters, Gear Cutters, Spiral Bevel, Hypoid & Zerol G12
16" P. D. helical cutters, Sharpening Machine, Gear Shaper Cutter, Planetary, Helical F5
Gear Cutters G12
Gear Cutters, Straight Bevel G12
6" dia., 20" face width, Reamer, Hob and Cutter Comb. B6
10" swing, 27" cc, Cutter & Reamer G1
6" dia., 42" cc, Reamer B6
20" dia. capacity, Die, Pipe Dies B20
Cut-Off Wheel C37
½" to 1⅜", Flute B26
4" dia., 4" face width, Hob, Automatic B6
6" dia., 5" face width, Hob, Hydraulic, Automatic B6
10" dia., 12" face width, Hob, Automatic B6
4" work dia., Multiple Thread Milling Cutter E19
4½" Max. Flute Length, 8¾" swing, Cutter & Radius P17
10" Max. Flute Length, 8¾" swing, Cutter & Radius P17
Form, Optical, "Visual Grind" C22
20 to 1 mag. ratio, Projecto-Form C12
12" swing, 12" cc, Contour, Cutter and Tool C12
Special, Inserted Blade Milling Cutter I4

Bench, Floor & Snag Grinders

Bench Double End

4-6" dia. wheel C28
6" dia. wheel A21
6" dia. wheel B3
6" dia. wheel B23
6" dia. wheel B36
6" dia. wheel B43
6" dia. wheel C5
6" dia. wheel C9
6" dia. wheel F10
6" dia. wheel H5
6" dia. wheel H22
6" dia. wheel, Grinder & Buffer Comb. H22
6" dia. wheel, Combination Drill H22
6" dia. wheel S30
6" dia. wheel T8
6" dia. wheel U4
6" dia. wheel W6
6-7" dia. wheel C28
7" dia. wheel A21
7" dia. wheel B3
7" dia. wheel B36
7" dia. wheel B43
7" dia. wheel C9
7" dia. wheel D6
7" dia. wheel H5
7" dia. wheel H22
7" dia. wheel Q1
7" dia. wheel S30
7" dia. wheel T8
7" dia. wheel U4
7" dia. wheel W6
8" dia. wheel B3
8" dia. wheel B23
8" dia. wheel B36
8" dia. wheel B43
8" dia. wheel B46
8" dia. wheel C5
8" dia. wheel C9
8" dia. wheel C28
8" dia. wheel H22
8" dia. wheel, Grinder & Buffer Comb. H22
8" dia. wheel Q1
8" dia. wheel S30
8" dia. wheel T8
8" dia. wheel U4
8" dia. wheel W6
10" dia. wheel B3
10" dia. wheel B23
10" dia. wheel B43
10" dia. wheel C5
10" dia. wheel C9
10" dia. wheel C28
10" dia. wheel F10
10" dia. wheel H5
10" dia. wheel H22
10" dia. wheel, Grinder & Buffer Comb. H22
10" dia. wheel Q1
10" dia. wheel S30
10" dia. wheel T8
10" dia. wheel U4
10" dia. wheel W6
10" x 1½" wheel G25
10" x 1½" wheel, Grinding & Buffing Machine Comb. G25
12" dia. wheel B3
12" dia. wheel B30
12" dia. wheel B36
12" dia. wheel B43
12" dia. wheel B46
12" dia. wheel C5
12" dia. wheel C9
12" dia. wheel C28
12" dia. wheel F10
12" dia. wheel H22
12" dia. wheel, Grinder & Buffer Comb. H22
12" dia. wheel L24
12" dia. wheel S30
12" x 2" wheel G25
12" x 2" wheel, Grinding & Buffing Machine Comb G25
14" dia. wheel C5
14" dia. wheel C9
14" dia. wheel C28
14" dia. wheel H22
16" dia. wheel C5
18" dia. wheel K12
24" dia. wheel K12
30" dia. wheel K12

Bench Single End

6" dia. wheel F10
10" dia. wheel F10
12" dia. wheel C5

Floor Double End Dry

6" dia. wheel C9
6" dia. wheel H5
6" dia. wheel H22
6" dia. wheel, Combination Drill H22
6" dia. wheel, Grinder & Buffer Comb. H22
6" dia. wheel U4
6" dia. wheel W6
7" dia. wheel B43
7" dia. wheel C9
7" dia. wheel H5
7" dia. wheel H22
7" dia. wheel, Combination Drill H22
7" dia. wheel Q1
7" dia. wheel U4
7" dia. wheel W6

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Bench, Floor, and Snag Grinders

Floor Double End Dry

(Continued)

8" dia. wheel B30
8" dia. wheel, Pulley B30
8" dia. wheel B43
8" dia. wheel C5
8" dia. wheel C9
8" dia. wheel H22
8" dia. wheel, Grinder & Buffer Comb. ..H22
8" dia. wheel Q1
8" dia. wheel S30
8" dia. wheel U4
8" & 10" dia. wheel S25
10" dia. wheel B30
10" dia. wheel B43
10" dia. wheel C5
10" dia. wheel C9
10" dia. wheel Q1
10" x 1½" wheel G25
10" x 1½" wheel, Grinding & Buffing Machine Comb. G25
10" dia. wheel H5
10" dia. wheel H22
10" dia. wheel, Combination Drill H22
10" dia. wheel, Grinder & Buffer Comb. .H22
10" dia. wheel S30
10" dia. wheel U4
10" x 1¾" wheel U4
10" dia. wheel W6
12" dia. wheel B30
12" dia. wheel, Long Spindle B30
12" dia. wheel, Grinder and Buffer Combination B36
12" dia. wheel B36
12" dia. wheel B43
12" dia. wheel C5
12" dia. wheel C9
12" dia. wheel H5
12" dia. wheel H22
12" dia. wheel, Combination Drill H22
12" dia. wheel, Grinder & Buffer Comb. .H22
12" dia. wheel L24
12" dia. wheel Q1
12" dia. wheel S30
12" dia. wheel, High Speed Tool U4
12" x 1½" wheel, Pedestal L21
12" x 1½" wheel U4
12" x 2" wheel G25
12" x 2" wheel, Grinding & Buffing Machine Comb. G25
12" x 2" wheel, Pedestal L21
12" x 2" wheel U4
12" x 3" wheel U4
14" dia. wheel B30
14" dia. wheel, Long Spindle B30
14" dia. wheel B36
14" dia. wheel B43
14" dia. wheel C5
14" dia. wheel C9
14" dia. wheel, 3 hp. Grinder and Buffer Combination B36
14" x 3" wheel G25
14" x 3" wheel, Grinding & Buffing Machine Comb. G25
14" dia. wheel H5
14" dia. wheel H22
14" dia. wheel, Grinder & Buffer Comb. .H22
14" dia. wheel L24
14" dia. wheel Q1
14" dia. wheel S30
14" dia. wheel, Overhang Type S30
14" x 2" wheel, Pedestal L21
14" x 2½" wheel U4
14" x 3" wheel, Pedestal L21
14" x 3" wheel U4
16" dia. wheel B30
16" dia. wheel, Long Spindle B30
16" dia. wheel B36
16" dia. wheel C5
16" dia. wheel L24
16" dia. wheel, Overhang Type S30
16" x 2" wheel U4
16" x 3" wheel G25
16" x 3" wheel U4
18" dia. wheel B30
18" dia. wheel, Long Spindle B30
18" dia. wheel B36
18" dia. wheel B43
18" dia. wheel C9
18" dia. wheel H5
18" dia. wheel H22
18" dia. wheel L24
18" dia. wheel S30
18" dia. wheel, Snag S30
18" dia. wheel, Overhang Type S30
18" x 3" wheel G25
18" x 3" wheel, Pedestal L21
18" x 3" wheel U4
20" dia. wheel B30
20" dia. wheel B36
20" dia. wheel C9
20" dia. wheel H22
20" dia. wheel L24
20" dia. wheel S30
20" dia. wheel, Overhang Type S30
20" dia. wheel, Snag S30
20" x 2" wheel U4
20" x 3" wheel G25
20" x 3" wheel, Double Motor G25
20" x 3" wheel U4
21" dia. wheel L24
24" dia. wheel B36
24" dia. wheel C9
24" dia. wheel H22
24" dia. wheel L24
24" dia. wheel, Snag S30
24" x 3" wheel U4
24" x 4" wheel G25
24" x 4" wheel, Double Motor G25
24" x 4" x 12" wheel G25
24" x 4" wheel U4
24" x 4¾" wheel U4
27" dia. wheel L24
30" dia. wheel B30
30" dia. wheel B36
30" dia. wheel H22
30" dia. wheel L24
30" dia. wheel, Snag S30
30" x 3" wheel U4
30" x 3" wheel, high speed U4
30" x 4" wheel G25
30" x 4" wheel, Double Motor G25
30" x 5" wheel U4
36" dia. wheel L24

Floor Single End

14" dia. wheel, Cup Wheel B30
18" dia. wheel H22
20" dia. wheel B30
20" dia. wheel H22
20" dia. wheel L24
20" dia. wheel, Snag S30
24" dia. wheel H22
24" dia. wheel, Snag S30
30" dia. wheel B30
30" dia. wheel H22
36" dia. wheel L24

Floor Double End, Wet Tool

10" dia. wheel H22
12" dia. wheel B30
12" dia. wheel, Cup Wheel B30
12" dia. wheel B36
12" dia. wheel H22
12" dia. wheel S30
14" dia. wheel, Cup Wheel B30
14" dia. wheel B36
14" dia. wheel H22
14" dia. wheel S30
18" dia. wheel H22
18" dia. wheel S30
20" dia. wheel H22
24" dia. wheel H22

Floor Combination Wet & Dry

10" dia. wheel, Double End H22
12" dia. wheel, Tool B30
12" dia. wheel C9
12" x 2" wheel U4
14" dia. wheel, Tool B30
20" dia. wheel, Single End, Dry F15
24" dia. wheel, Single End, Dry F15
30" dia. wheel, Single End, Dry F15

Not Elsewhere Classified

6" dia. wheel, Grinder & Buffer Comb. Bench B3
6" dia. wheel, Grinder & Buffer Comb. .B43
7" dia. wheel, Grinder & Buffer Comb. Bench B3
7" dia. wheel, Grinder & Buffer Comb. .B43
7" dia. wheel, Grinding & Disk Sanding Comb. Bench W6
8" dia. wheel, Grinder & Buffer Comb. Bench B3
8" dia. wheel, Grinder & Buffer Comb. Floor B30
8" dia. wheel, Grinder & Buffer Comb. .B43
8" dia. wheel, 7" disk, Comb. Disk and Wheel C9
8" dia. wheel, Grinder and Buffer Comb. .C9
8" dia. wheel, Radial M38
8" dia. wheel, Grinding & Buffing Machine Comb. S30
8" dia. wheel, Grinder & Buffer Comb. Bench U4
8" dia. wheel, 7" disk, Grinder, Comb. Disk, Floor U4
8" dia. wheel, Grinder & Buffer Comb. Floor U4
10" dia. wheel, Grinder & Buffer Comb. Floor B30
10" dia. wheel, Grinder & Buffer Comb. .B43
10" dia. wheel, 8" disk, Comb. Disk & Wheel C9
10" dia. wheel, Grinder & Buffer Comb. .C9
10" dia. wheel, Single Wheel, Belt Drive, Bench C28
10" dia. wheel, Light Maintenance, Wet Stone D20
10" dia. wheel, Grinder & Buffer Comb., Double End H5
10" wheel, 12" disk H22
10" dia. wheel Q1
10" dia. wheel, Grinding Machine & Disc Grinding Machine Comb. S30
10" dia. wheel, Grinding & Buffing Machine Comb. S30
10" dia. wheel, Grinder & Buffer Comb. Bench U4
10" dia. wheel, Grinder & Buffer Comb. Floor U4
10" dia. wheel, 8" disk, Grinder, Comb. Disk, Floor U4
10" x 3" wheel, Swing Frame G25
12" dia. wheel, Grinder & Buffer Comb. Floor B30
12" dia. wheel, 10" disk, Comb. Disk and Wheel C9
12" dia. wheel, Grinder & Buffer Comb. .C9
12" dia. wheel, Swing Frame F15
12" x 3" wheel, Swing Frame G25
12" dia. wheel, Grinder & Buffer Comb., Double End H5
12" dia. wheel & disk H22
12" dia. wheel, 15" dia. disk H22
12" dia. wheel, Radial M38
12" dia. wheel, Swing Frame M38
12" dia. wheel Q1
12" dia. wheel, Grinding Machine, Wet Stone S30
12" dia. wheel, Grinding Machine and Disk Grinding Machine Comb. .S30
12" dia. wheel, Grinding & Buffing Machine Comb. S30
12" dia. wheel, 10" disk, Grinder, Comb. Disk, Floor U4
12" dia. wheel, 12" disk, Grinder, Comb. Disk, Floor U4
12" dia. wheel, Grinder & Buffer Comb. Bench U4
12" dia. wheel, Grinder & Buffer Comb. Floor U4
14" dia. wheel, Buffer & Grinder Comb. Floor B30
14" dia. wheel, Grinder & Buffer Comb. .C9
14" dia. wheel, 12" disk, Comb. Disk & Wheel C9
14" dia. wheel, Swing Frame M38
14" dia. wheel, Radial M38
14" dia. wheel Q1
14" x 2" wheel, Swing G25
14" x 3" wheel, Swing Frame G25
14" dia. wheel, Grinder & Buffer Comb., Double End H5
14" dia. wheel & disk H22
14" dia. wheel, 18" dia. disk H22
14" dia. wheel, Grinding Machine & and Disk Grinding Machine Comb. .S30
14" dia. wheel, Grinding & Buffing Machine Comb. S30
14" dia. wheel, Grinder & Buffer Comb. Bench U4
14" dia. wheel, Grinder & Buffer Comb. Floor U4
14" dia. wheel, 14" disk, Grinder Comb. Disk, Floor U4
16" dia. wheel, Swing Frame F15
16" dia. wheel, Swing Frame M38
16" dia. wheel, Radial M38
16" x 3" wheel, Swing Frame G25
16" dia. wheel, 16" disk, Grinder, Comb. Disk, Floor U4
18" dia. wheel, 18" disk, Comb. Disk and Wheel C9
18" dia. wheel, Swing Frame M38
18" dia. wheel, Radial M38
18" x 3" x 5" wheel, Swing Frame G25
18" x 3" wheel, Swing G25
18" x 3" wheel, Swing Frame G25
18" dia. wheel & disk H22
18" dia. wheel, 20" dia. disk H22
18" dia. wheel, Grinding Machine and Disk Grinding Machine Comb. .S30
18" dia. wheel, Grinding & Buffing Machine Comb. S30
18" dia. wheel, 18" disk, Grinder, Comb. Disk, Floor U4
20" dia. wheel, Swing Frame F15
20" dia. wheel, Swing Frame M38
20" dia. wheel, Radial M38
20" dia. wheel, 20" dia. disk H22
20" dia. wheel, Grinding Machine and Disk Grinding Machine Comb. .S30
20" dia. wheel, 20" disk, Grinder, Comb. Disk, Floor U4
20" x 3" wheel, Swing Frame G25
24" dia. wheel, Swing Frame F15
24" dia. wheel, Swing Frame M38
24" dia. wheel, Radial M38
24" x 3" wheel, Swing Frame G25
24" dia. wheel, Grinding Machine and Disk Grinding Machine Comb. .S30
4" x 141" belt, Belt, Swing Frame F15
1½ hp-150 hp, Production Type Foundry Grinders M16

GRINDING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Special Purpose Grinding Machines

Race Radius Grinders

0" to 2" dia. inner race, External ... V2
1" to 7" dia. inner race, External ... V2
2" dia. outer race, Internal ... V2
3" dia. end race, External Thrust ... V2
3" to 16" dia. inner race, External ... V2
5" radius thrust race, External Thrust ... V2
5" dia. outer race, Internal ... V2
5" dia. end race, External Thrust ... V2
16" dia. thrust race, External Thrust ... V2
18" dia. outer race, Internal ... V2
⅝" to 3½" work dia., Micro-Centric ... C12
2" to 8" work dia., Micro-Centric ... C12
9" swing ... B45
Ball Race-Internal ... L5
Ball Race-External ... L5

Spline Grinders, Not Including Gear & Spline

9" wide, 24" long, Spiral ... T7
9" wide, 24" long, Straight ... T7
9" wide, 48" long, Spiral ... T7
9" wide, 48" long, Straight ... T7
9" wide, 60" long, Spiral ... T7
9" wide, 60" long, Straight ... T7
9" wide, 72" long, Spiral ... T7
9" wide, 72" long, Straight ... T7
9" wide, 84" long, Spiral ... T7
9" wide, 84" long, Straight ... T7

Contour Profile Grinders

to 1" dia. wheels, 20,000 & 30,000 RPM spindle speeds, Bench Type ... R8
1"-4" dia. wheels ... B2
1 or 2 spindles, Floor ... B34
3½" max., 1⅝" min. dia. wheel ... E19
12" dia. table, Rotary Table ... T7
16" dia. table, Rotary Table ... T7
24" swing, 8" wheel, Internal Contour ... E15
2" to 3" wide, 8½" long ... E19
6" wide, 18" long ... E19
Bench ... B34
Special, Form Grinder, Work Viewing Scope & Screen ... S9
Special, Form Grinder, Work Viewing Scope ... S9

Not Elsewhere Classified

10" x 16" table working surface, Jig, Vertical ... M33
10" x 19" table working surface, Jig, Vertical ... M33
1⅛" valve stem, 3½" valve, Valve Refacer, Wet Type ... B23
1¾" valve stem, 5¾" valve, Universal Valve and Tool, Wet Type ... B23
Valve Seat, Wet Type ... W11
Valve Seat, Dry Type ... W11
2 spindle, Valve Seat, Wet Type ... W11
3 spindle, Valve Seat, Individual Heads ... W11
4 spindle, Valve Seat, In Line Type ... W11
6 spindle, Valve Seat, In Line Type ... W11
8 spindle, Valve Seat, In Line Type ... W11
8 spindle, Valve Seat, V-8 Type ... W11
12 spindle, Valve Seat, V-12 Type ... W11
16" dia. wheel, 14" x 72" table, Surface, Wet, Inverted Vertical Spindle, Automotive Heads, Blocks ... L18
Special, Valve Seat ... W2
Grinding Machine, Valve Face ... L5
6" wide belt, Blade Contour ... R22
12" wide belt, Blade Edging ... R22
12" dia. wheel, 15" table travel, Surface Form Jet Engine Blade ... E19
24" dia., 12" hole, ½" to 1⅝" face, 15" table travel, Two-Wheel Jet Engine Blades ... E19
9" Max. Length, 4" wide blade, Turbine Blade Airfoil ... P17
3" wide, 6" long, Double Wheel Turbine Bucket ... T7
0" to 4" work dia., External Cylindrical, Chucking ... C12
2" to 8" work dia., External Cylindrical, Chucking ... C12
16" to 44" swing, Vertical Universal Chucking Machines ... S28
12" wide, 48" long, Vertical Spindle, Way Grinder ... M8
12" wide, 60" long, Vertical Spindle, Way Grinder ... M8
14" wide, 48" long, Vertical Spindle, Way Grinder ... M8
14" wide, 60" long, Vertical Spindle, Way Grinder ... M8
16" wide, 72" long, Vertical Spindle, Way Grinder ... M8
18" wide, 96" long, Vertical Spindle, Way Grinder ... M8
18" wide, 120" long, Vertical Spindle, Way Grinder ... M8
18" wide, 168" long, Vertical Spindle, Way Grinder ... M8
20" wide, 96" long, Vertical Spindle, Way Grinder ... M8
20" wide, 120" long, Vertical Spindle, Way Grinder ... M8
20" wide, 168" long, Vertical Spindle, Way Grinder ... M8
24" wide, 96" long, Vertical Spindle, Way Grinder ... M8
24" wide, 120" long, Vertical Spindle, Way Grinder ... M8
24" wide, 168" long, Vertical Spindle, Way Grinder ... M8
30" wide, 96" long, Vertical Spindle, Way Grinder ... M8
30" wide, 120" long, Vertical Spindle, Way Grinder ... M8
30" wide, 168" long, Vertical Spindle, Way Grinder ... M8
30" wide, 192" long, Vertical Spindle, Way Grinder ... M8
36" wide, 96" long, Vertical Spindle, Way Grinder ... M8
36" wide, 120" long, Vertical Spindle, Way Grinder ... M8
36" wide, 168" long, Vertical Spindle, Way Grinder ... M8
36" wide, 192" long, Vertical Spindle, Way Grinder ... M8
¼" lapping pins, Grinding Machine, Pin ... D21
2" to 11" cap., Hollow Grinder, Cutlery ... N16
6½" swing, 50" cc ... S40
8½" dia. table ... A20
14" x 72" table, Surface, Angle, Horizontal Flat & Face Surfacing ... L18
15" swing, 48" cc ... S40
18" to 24" cap., Universal, Left & Right Hand ... N16
18" swing, 62" cc ... S40
20 hp-150 hp, Precision Production Surface Grinders ... M16
Plunge Cut Grinding ... V2
Internal ... R22
Sizing ... R22
Surfacing ... R22
Grinding Machine, Chucking ... L5
4" swing, Grinding Machines, Concentric ... L5
Special Single Purpose Production Grinders ... M16
Special Grinding ... V2

HONING AND LAPPING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Honing Machines

Honing Horizontal, Internal

.120" to 2.625" dia. bore S41
⅛" to 4" dia., 10" long, Hand Type S33
⅜" to 2" dia. mandrels, Bench S44
⅛" to 3" dia. mandrels, Floor S44
¾" to 3" dia., 48" long S33
1½" dia. bore, 72" stroke, Hydraulic B8
1½" dia. bore, 96" stroke, Hydraulic B8
1½" dia. bore, 120" stroke, Hydraulic B8
1½" dia. bore, 144" stroke, Hydraulic B8
2" dia. bore, 96" stroke, Hydraulic B8
2" dia. bore, 144" stroke, Hydraulic B8
2" dia. bore, 192" stroke, Hydraulic B8
2" dia. bore, 240" stroke, Hydraulic B8
6" dia. bore, 96" stroke, Hydraulic B8
6" dia. bore, 120" stroke, Hydraulic B8
6" dia. bore, 168" stroke, Hydraulic B8
6" dia. bore, 216" stroke, Hydraulic B8
6" dia. bore, 288" stroke, Hydraulic B8
10" work dia., 240" stroke M22
10" work dia., stroke special M22
12" dia. bore, 96" stroke, Hydraulic B8
12" dia. bore, 192" stroke, Hydraulic B8
12" dia. bore, 32' stroke, Hydraulic B8
20" dia. bore, Special, Hydraulic B8
30" dia. bore, 62" swing, Hydraulic B8
Special B9

Honing Vertical, Internal

¼" to 4" dia. bore, 15" stroke F20
⅜" work dia., 1" stroke M22
¾" work dia., 3" stroke M22
¾" to 3" dia., 10" long S33
1" to 10" dia. bore, 25" stroke F20
1" to 10" dia. bore, 36" stroke F20
1" to 10" dia. bore, 48" stroke F20
1" to 10" dia. bore, 60" stroke F20
1" work dia., 10" stroke, 2 spindle Automatic Sizing M22
1¼" work dia., 10" stroke M22
2" work dia., 10" stroke M22
2" work dia., 10" stroke, 2 spindle, Automatic Sizing M22
2" dia. bore, 15" swing, Connecting Rod, Mechanical B8
2" dia. bore, 18" swing, Connecting Rod, Hydraulic B8
2" to 15" dia. bore, 36" stroke F20
2" to 15" dia. bore, 48" stroke F20
2" to 15" dia. bore, 60" stroke F20
2" to 15" dia. bore, 72" stroke F20
3" to 24" dia. bore, 48" stroke F20
3" to 24" dia. bore, 60" stroke F20
3" to 24" dia. bore, 72" stroke F20
4" work dia., 2" stroke M22
4" work dia., 12" stroke M22
4" work dia., 20" stroke M22
20" stroke, Multiple Spindle M22
4" dia. bore, 22" swing, Hydraulic B8
4" dia. bore, 24" swing, Hydraulic B8
4" work dia., 40" stroke M22
6" work dia., 15" stroke M22
6" dia. bore, 30" swing, Connecting Rod, Hydraulic B8
6" dia. bore, 30" swing, Comb. Boring & Honing B8
6" to 36" dia. bore, 84" stroke F20
6" to 36" dia. bore, 96" stroke F20
6" to 36" dia. bore, 120" stroke F20
6" to 36" dia. bore, 144" stroke F20
7" dia. bore, 30" swing, Hydraulic B8
8" work dia., 30" stroke M22
8" work dia., 50" stroke M22
8" work dia., 70" stroke M22
9" dia. bore, 24" swing, Connecting Rod, Hydraulic B8
14" dia. bore, 40" swing, Hydraulic B8
20" dia. bore, 40" swing, Hydraulic B8
30" dia. bore, 40" swing, Hydraulic B8
24" swing, 8 cylinder, Multi-spindle, Hydraulic B8
1 spindle M31
2 to 8 spindle M31

Honing External & Surface

⅛" to 2" dia., 5" long, Hand Type, Horizontal S33
¾" to 3" dia., 40" long, Horizontal S33
5" dia. bore, 16" swing, Horizontal Hydraulic B8
18" plate dia., 7" work cap., Flat, Single Surface M22
21" plate dia., 3½" work cap., Flat, Double Surface M22
44" plate dia., 6¾" work cap., Flat, Double Surface M22
44" plate dia., 20" work cap., Flat, Single Surface M22

Lapping Machines

Lapping, Flat Surface

12" lap plate dia. C45
12" dia. wheel, Vertical G2
18" dia. wheel, Vertical G2
20" dia. lap, Vertical N14
22" dia. lap, Vertical N14
24" lap plate dia. C45
24" dia. lap, Vertical N14
24" dia., Rotary T2
26" dia. lap, Vertical N14
28" dia. lap, Vertical N14
30" dia. wheel, Vertical G2
34" dia. lap cast iron, Vertical N14
36" lap plate dia. C45
36" dia. wheel, Vertical G2
36" dia. lap, Vertical N14
40" dia. wheel, Vertical G2
48" lap plate dia. C45
53" dia. wheel, Vertical G2
60" dia. lap, Vertical N14
72" lap plate dia. C45
72" dia. wheel, Vertical G2

Lapping, Cylindrical

0.001 to 10.0", Centerless S18
⅜" to ⅝" dia. hole, 10" table travel E19
¼" cap. pins D21
¼" lapping pins D21
¼" to 6" work dia., Centerless C12
⅝" to 1½" cap. pins D21
3" dia., 7½" length work cap., Vertical, External N14
4" dia., 9" length work cap., Vertical External N14
10" dia., 36" long, Vertical, Female Work Centers E19
10" dia., 60" long, Vertical, Female Work Centers E19

Lapping, Combination Flat Surface & Cylindrical

8" dia. lap, Vertical N14
14" dia. lap, Vertical N14
16" dia. lap, Vertical N14
18" dia. lap, Vertical N14

Lapping Machines, Special Purpose

⅛" to ¾" tools, Carbide Tool, Mechanical, Semi-Automatic H13
3,000 rpm grinding wheel, 110 rpm millstone, Grinder-Hone, 2 wheels A21
12" stroke, Piston Ring, Air Operated B8
12" stroke, Piston Ring, Hydraulic B8
14" swing, 36" cc, Horizontal, Crankshaft N14

Combination Honing & Lapping, Including Superfinishing

2½" dia. work, External, Cylindrical, Surface Finishing N14
2½" swing, 5" length, Superfinisher, Flat, 9-spindle G10
3¾" swing, 5¾" length, Superfinisher, Cylindrical, 2-spindle G10
6¼" swing, 17" cc, Superfinishing Machine, Manual or Automatic Table Traverse L3
8½" swing, 12" length, Superfinisher, General Purpose G10
10½" swing, 18" length, Superfinisher, General Purpose G10
10½" swing, 36" length, Superfinisher, General Purpose G10
12" swing, 40" length, Superfinisher, Crankshaft G10
12" swing, 60" length, Superfinisher, Crankshaft G10
13" swing, 12" x 16" table, Superfinishing Machine, Vertical L3
14" swing, 48" cc, Superfinishing Hand Carriage L3
14" swing, 62" cc, Superfinishing, Hand Carriage L3
14" swing, 48" cc, Superfinishing Machine, Automatic Carriage L3
14" swing, 62" cc, Superfinishing Machine, Automatic Carriage L3
16¼" swing, Superfinishing Machine, Vertical L3
19" swing, 6" length, Superfinisher, Brake Drum G10
21" swing, 15" dia., Superfinisher, Flat, 2-spindle G10

In grinding...

You get the "TOUCH OF GOLD" from Norton

Norton grinding and lapping machines add value and profit to everything they produce

Only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower costs. Norton really gives you the "Touch of Gold" that increases product value and adds to product profit.

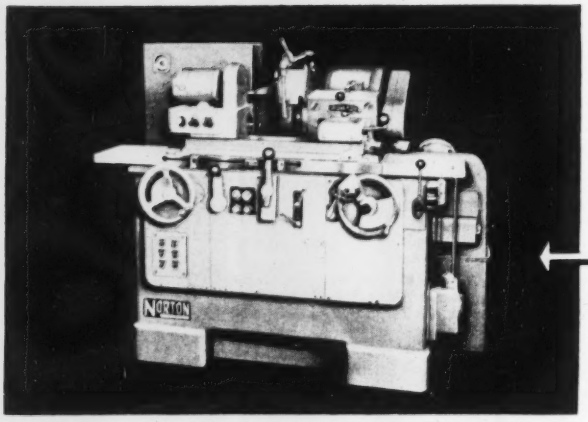
Take advantage of this experience to discuss with us your present grinding problems or your post-emergency production to fit tentative delivery schedules into your future plans.

To Economize Modernize With **NEW**

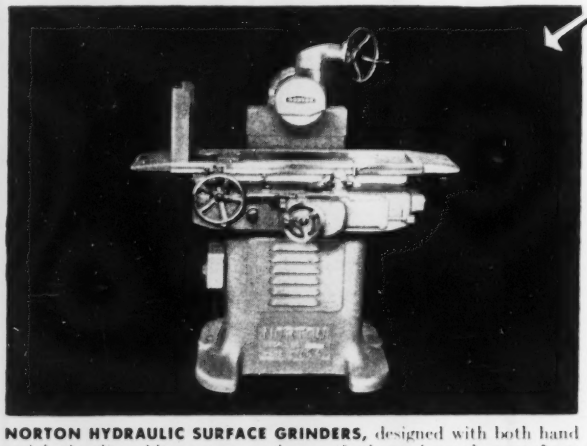
NORTON

GRINDERS *and* **LAPPERS**

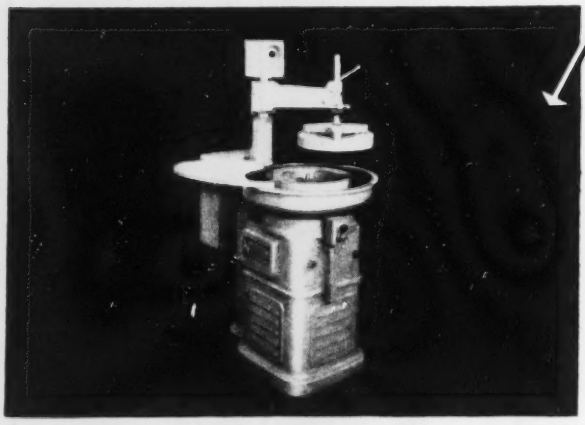
Making better products to make other products better



NEW NORTON 4" TYPE CTU Semiautomatic, in 12" and 18" work-length capacities, rounds out the Norton Cylindrical Grinder Line. Like the larger 6" and 10" CTU's, it offers you a unique combination of speed, accuracy, flexibility and sturdiness. All Norton CTU Semiautomatics have "one lever" control of automatic time cycle which reduces operator attention merely to loading and unloading. *Catalog No. 541* gives you all details.



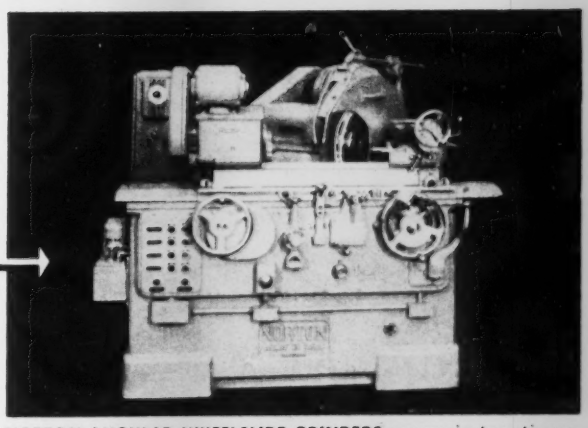
NORTON HYDRAULIC SURFACE GRINDERS, designed with both hand and hydraulic table traverse and cross feed, produce plane surfaces smoothly and speedily. Convenient controls and easy accessibility keep operating and maintenance time low. Such extras as a permanent magnet or direct current type chuck, wet grinding attachment or individual dust exhaust system help make a good basic machine better. Three sizes: 6", 8", and 10". *Write for Catalogs 954 (6"); 190 (8") and 1745 (10")*



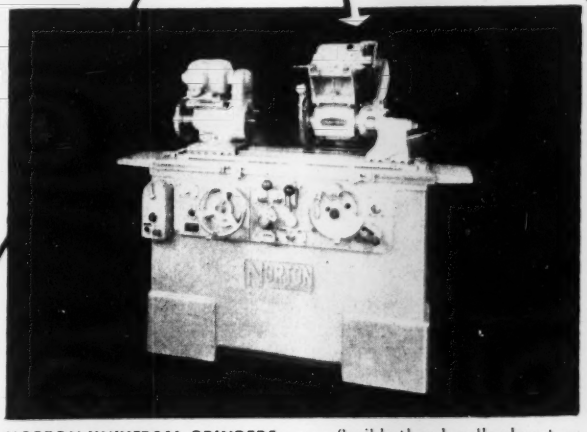
NORTON TYPE 16FC VERTICAL LAPPER produces either flat or cylindrical work to a high degree of dimensional accuracy, parallelism and finish. Widely used for such work as diesel injector parts, plug gages, size blocks, sides of small bearing races, pump gears and plates and other parts. Other Norton lappers are available. *Write for Catalog 214 and General Catalog 1845.*

Norton Grinders and Lappers

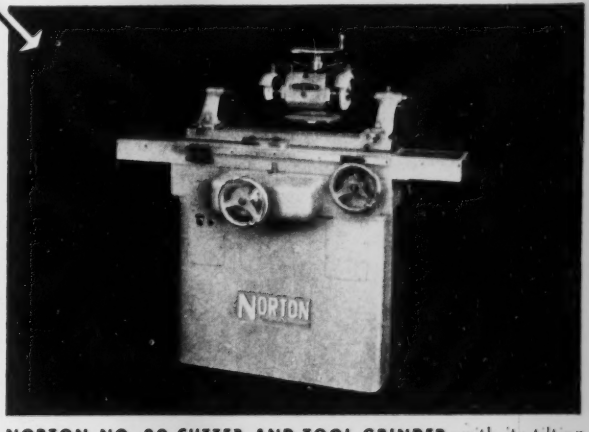
The world's most complete line



NORTON ANGULAR WHEELSLIDE GRINDERS are semiautomatic machines which simultaneously grind thrust surfaces and adjacent diameters to finest accuracy and finish. By eliminating the need for an extra operation, they cut over-all production costs. "One lever" control of automatic time cycle, as in CTU's, helps operators produce more with less effort. Two sizes: 6"x18" and 10"x36". *Catalogs No. 533 (6"x18") and 1793 (10"x36")* give you more information.



NORTON UNIVERSAL GRINDERS are so flexible they handle almost an endless variety of jobs. Compound swivel arrangement allows you to set and feed the wheel at any angle. External, internal, face or angular wheelslide operations come easy with Norton Universal Grinders. Four sizes: 10"x20" and 12", 14", or 16", each with work length capacities of 36", 48", or 72". *Write for Catalogs 170 (10"x20") and 1668 (12", 14", 16").*



NORTON NO. 20 CUTTER AND TOOL GRINDER, with its tilting wheel head, is the most versatile machine in its class. Wheel head tilts 15° above or below horizontal . . . may be swivelled 360° in a horizontal plane. Integral motor cartridge type spindle, duplicate controls for front or either side operation are other features that make this machine first choice for toolroom grinding. *Write for Catalog 189.*

ONLY NORTON OFFERS YOU OVER 50 YEARS OF COMBINED EXPERIENCE IN:

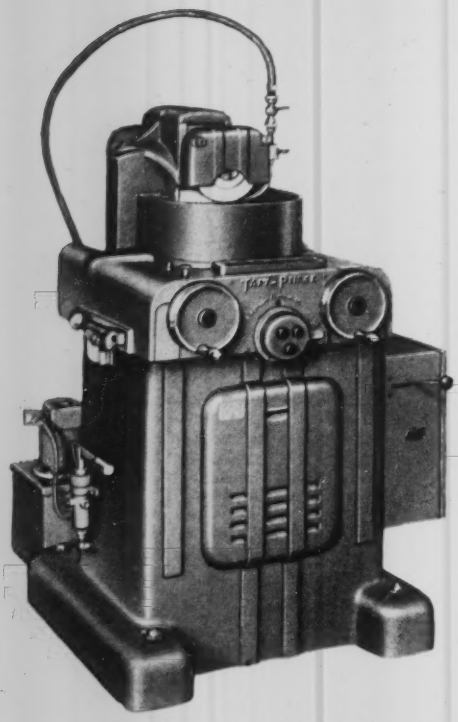
Abrasives and Grinding Wheels

Machines for Cylindrical Grinding • Surface Grinding • Cylindrical and Flat Lapping • Universal Tool and Cutter Grinding • Universal Multipurpose Grinding • Specialized Grinding • Crankshaft Grinding • Cam Shaft and Contour Grinding • Roll Grinding.

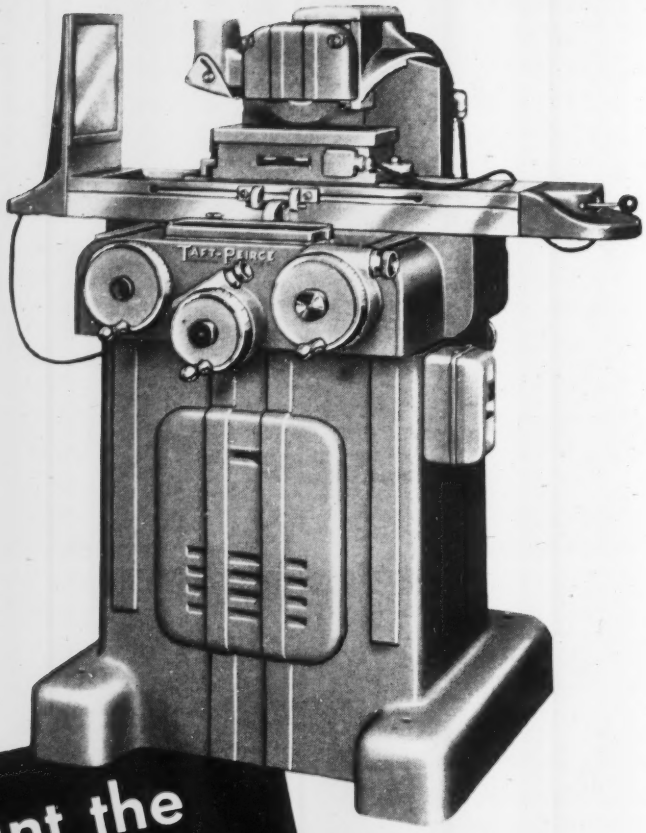
NORTON COMPANY • MACHINE DIVISION • WORCESTER 6, MASS.

District Sales Offices: Hartford • New York • Cleveland • Chicago • Detroit

In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

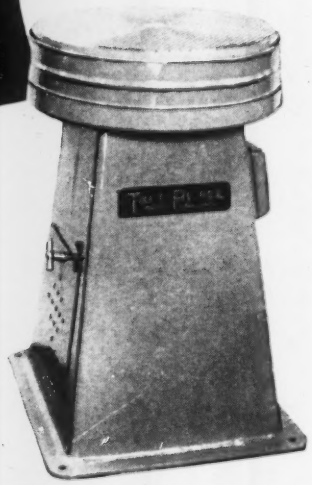


The Taft-Peirce 6" Rotary Grinder with .0001" vernier for super-precise rotary grinding.



The Taft-Peirce No. 1 Precision Surface Grinder with .0001" vertical and cross feed verniers for the highest degree of accuracy, flatness, and finish on plane surfaces.

When you want the *Ultimate in Accuracy* try this trio



The Taft-Peirce 24" Lapping Machine for that last critical element of precision super-finish on plane or cylindrical surfaces.

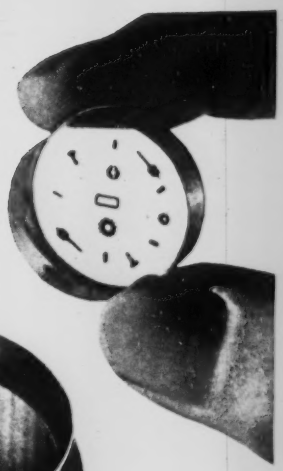
The accumulated skill of the world's most experienced tool and gage makers has gone into these three machines . . . all originally developed *for our own gage production.* Each has been designed and built with the ultimate care to give the ultimate in accuracy, flatness, and finish. If accuracy is *your* problem . . . let us tell you about the unusual features of these machines.

THE TAFT-PEIRCE MANUFACTURING COMPANY
WOONSOCKET, RHODE ISLAND

T-P *means* Top Precision

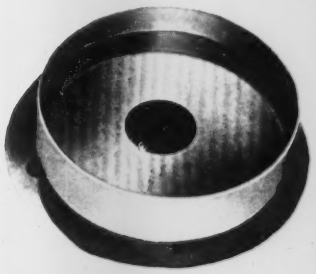
Tiny?

Yes! The No. 11 Blanchard Surface Grinder grinds these ladies' watch gears, pinions and ruby bearings flat and parallel, and to a dimension tolerance of .0002".



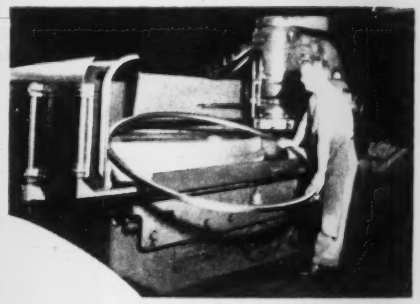
Smooth?

Of course! The Blanchard No. 11 finished this refrigerator plate, seen through an optical flat, to 3 micro inches and flat within 1 light band (.0000118").



Accurate?

Sure . . . and easy, too! This Blanchard grinds 84" forged steel rings flat within .0002", parallel to .0002", dimension tolerance of ±.0005", and with surface finish of 4 micro inches.



Tremendous?

Yes . . . but fast! This 88" diameter cast-iron plate was ground on a No. 42-72-84 Blanchard in 3½ hrs., floor to floor. ¼" of stock—1520 cu. in.—380 lbs. was removed.

If you produce flat surfaces, your best bet is Blanchard Grinders—with Blanchard Wheels!

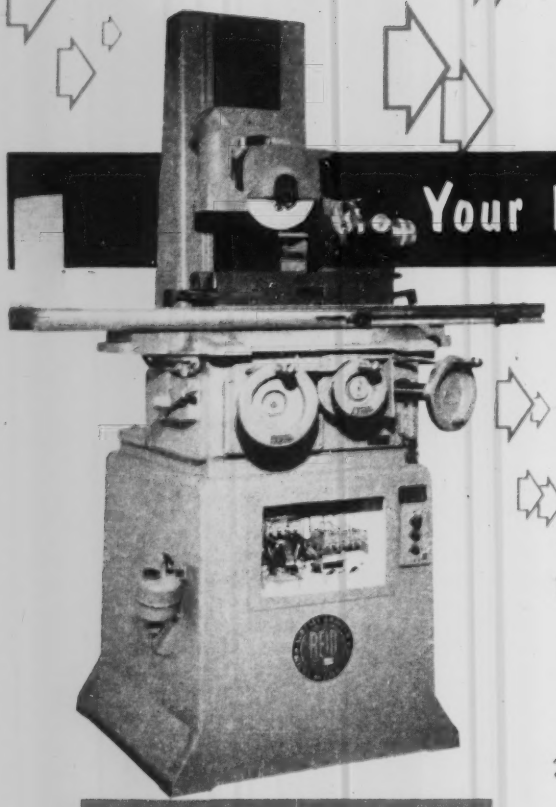
PUT IT ON THE BLANCHARD

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "Art of Blanchard Surface Grinding".

THE BLANCHARD MACHINE CO.
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

REID

Your Best Surface Grinder Buy



MODEL 618VL

Capacity:
6" x 18" x 17¼" from center of spindle to worktable.

Worktable:
51" x 8".

Table speed:
12 to 35 feet per minute.

Floor space:
70" x 30".

Weight:
2100 lbs.

Shown with magnetic chuck and Reid Radius Dresser (optional).

Feature by feature comparison will quickly show why Reid is the preferred surface grinder in so many modern plants. Management finds it a sound investment in terms of quality production. In the toolroom a Reid soon proves its worth as a *precision* machine tool for dependable results.

Here's why!

1. PRECISION

. . . split a ten thousandth and be sure the finished result will measure up. Reid Grinders are quality engineered in every detail to provide the extreme precision required by toolmakers.

2. BETTER SURFACE FINISH

. . . with the motorized spindle turning on pre-loaded bearings to eliminate wheel chatter, and the work table running smoothly on hand-scraped ways, ground pieces have a visibly finer surface finish.

3. EASIER OPERATION

. . . finger-tip level controls eliminate stretching and bending, lessen operator fatigue. And, the electrical controls are fully visible, yet protected behind a transparent shatter-proof panel.

4. RUGGED DESIGN

. . . all mechanical units built around rugged one-piece column casting to insure permanent alignment of cross-slide saddleways and vertical headways. Column is mounted on heavy cast iron base for maximum rigidity and freedom from vibration.

For complete details, please request Bulletin 618-14.

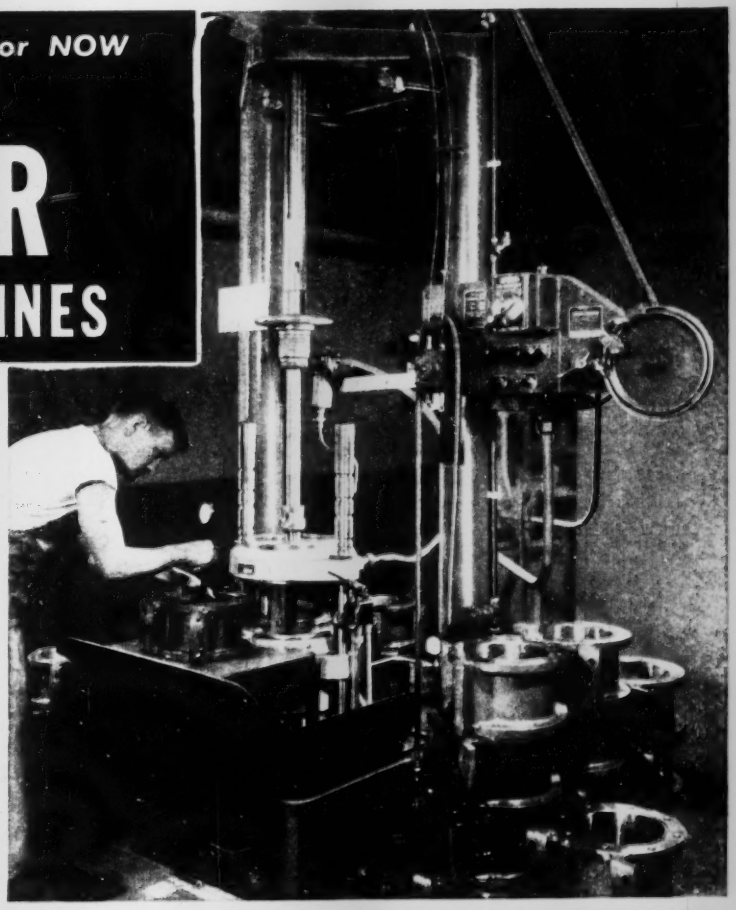
Reid Brothers Company, Inc.

ELLIOTT STREET • BEVERLY, MASSACHUSETTS

Your Production Plans for NOW and the FUTURE should include

FULMER HONING MACHINES

for fast precision finishing of internal cylinders



Photograph shows a Fulmer 10/36 Honing Machine with power clamping fixtures honing cast iron cylinders in the plant of Republic Flowmeters Corporation, Chicago, Ill.

WHAT IS HONING?

HONING is a stock-removing process in which abrasive stones are applied under controlled pressure in a rotary and reciprocating motion SIMULTANEOUSLY, to produce a *round and straight bore to the finest degree of accuracy.* The stones shear off the metal, producing small chips ranging from dust to the familiar curly pattern of lathe chips, depending on the finish desired.

for ferrous, non-ferrous metals, plastics, glass etc.

HOW FULMER HONING MACHINES OPERATE:

FIRST: they CUT AWAY high spots until all irregularities are removed . . .

THEN: the self-aligning hones CORRECT any inaccuracies of previous operations and FINISH THE INTERNAL BORES with amazing speed to tolerances as close as .0001 (±). Chips as long as 6 inches may be removed. Stock can be removed up to a rate of 1½ to 2 cu. in. or more per minute.

for almost any type of internal bore requiring high accuracy.

FULMER SUPPLIES EVERYTHING IN "ONE PACKAGE"
Honing Machine . . . Fixtures . . . Tools . . . Stones . . . Hones

Write for Bulletin on Honing

C. ALLEN FULMER CO.

1248 FIRST NATIONAL BANK BLDG.,
CINCINNATI 2, OHIO

Bryant internal grinders

for every requirement of tool room, small lot and production work

Bryant has specialized in the designing and building of internal grinders for 40 years, and has developed a line of grinders to meet all requirements, both from the standpoint of size and application. In size, the smaller machines will finish holes only a few thousandths of an inch in diameter while the larger machines have a swing of five feet and over. By application, machines are built as semi-automatics, automatics, and automatics with loaders. Other standard machines are equipped with two spindles for finishing two or more surfaces at one chucking. The machines are engineered to take advantage of variable hydraulic systems, electric controls or fully mechanical machines, depending upon the capacity, type of work, and rate of production. All Bryant machines are designed around the Bryant steel cylindrical slide bar. With the larger machines, the slide traverses on an oil film; with the small machines, the slides are pre-loaded ball construction affording maximum rigidity for precision work. Standard and special machines can grind straight, tapered, curved or irregular holes, or any of these in combination. Face and hole grinding can be combined to assure squareness. Cams and irregular holes can be ground by using the cam attachment.

A general catalogue, or information on a specific machine, is available on request.

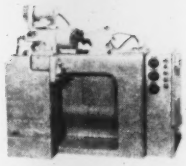
	← SWING →				
TYPE	9"	16"	26"	60"	80"
Semi-Auto.	1109	1116	1126		
Auto.	1209 2209	3216			
Two Spindle	1309-W	1316 1316-R	1326		
Long Work		1416		1460	1480

The above tabulation covers standard machines. Modifications covering special machines may be quoted on request.

Bryant Chucking Grinder Company
Springfield, Vermont, U. S. A.

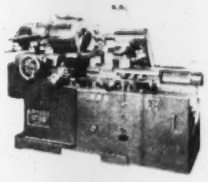
no. 1109

For high production of small bores where accuracy of size and finish are required. Max. traverse stroke, 6". Max. grinding length, 3½".



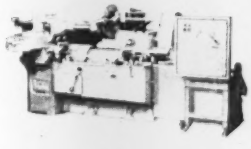
no. 1116

A general purpose hole grinder for tool room, small shop, or general production. Maximum traverse stroke, 20". Maximum grinding length, 8".



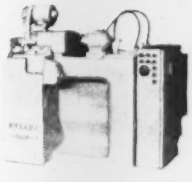
no. 1126

For grinding large work to close tolerances for assured interchangeability. Max. traverse stroke, 20". Max. grinding length, 12".



no. 1209

A fully automatic, high production machine for small and medium bore grinding. Max. traverse stroke, 6". Max. grinding length, 3".

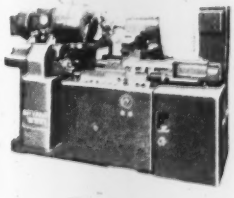


no. 2209

For precision and high production grinding of ball bearing races, gears, rolls, bushings, etc. Max. traverse stroke, 6". Max. grinding length, ¾".

no. 3216

A heavy machine for automatic high production of precision work — requiring a minimum of operator attention. Max. traverse stroke, 15". Max. grinding length, 6".



no. 1309-W

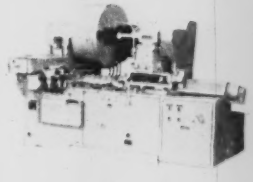
Finishes 2 bores and a taper straight and concentric. 2 wheelheads are used on this semi-automatic. Max. traverse stroke, 6". Max. grinding length, 3½".

no. 1316

Two wheelheads for high production of jobs requiring face and bore, or face and O.D. grinding. Max. traverse stroke, 20". Max. grinding length, 8".

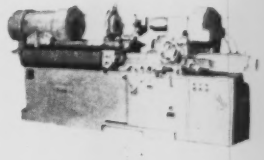
no. 1326

Semi-automatic production machine for finishing I.D. and O.D., or I.D. and face in a single chucking. Max. traverse stroke, 20". Max. grinding length, 12".



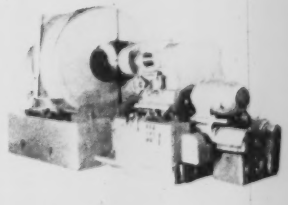
no. 1416

Specially designed for grinding bores in long work, such as machine tool spindles. Maximum traverse stroke, 20". Maximum grinding length, 8".



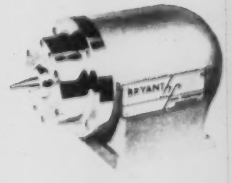
no. 1460

For production or single piece hole grinding on parts up to 60" diameter. Max. traverse stroke, 21". Max. grinding length, 16".



hi-frequency wheelhead

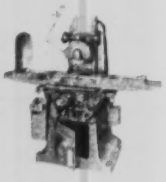
Electric wheel spindle for small hole grinding. Provides speeds up to 100,000 R.P.M. for efficient wheel speeds up to 5000 S.F.M.



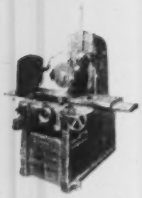
WHERE TO BUY

ABRASIVE SURFACE GRINDERS

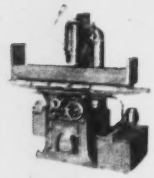
No. 1½ Hand Feed Surface Grinder — world's favorite tool-room grinder.



No. 3B Horizontal Spindle Surface Grinder — Thousands in use in production, toolmaking.



No. 1218 Hydrabrasive — the last word in grinders — hydraulic feeds — modern design throughout.



No. M34 Vertical Spindle Grinder — the only grinder of its type in this capacity range.

Abrasive also offers 18" Face Grinder — No. M3 Motorized Spindle Surface Grinder — No. 5 AWF Internal Finisher — Model GC Circular Graduating Machine — Accessories

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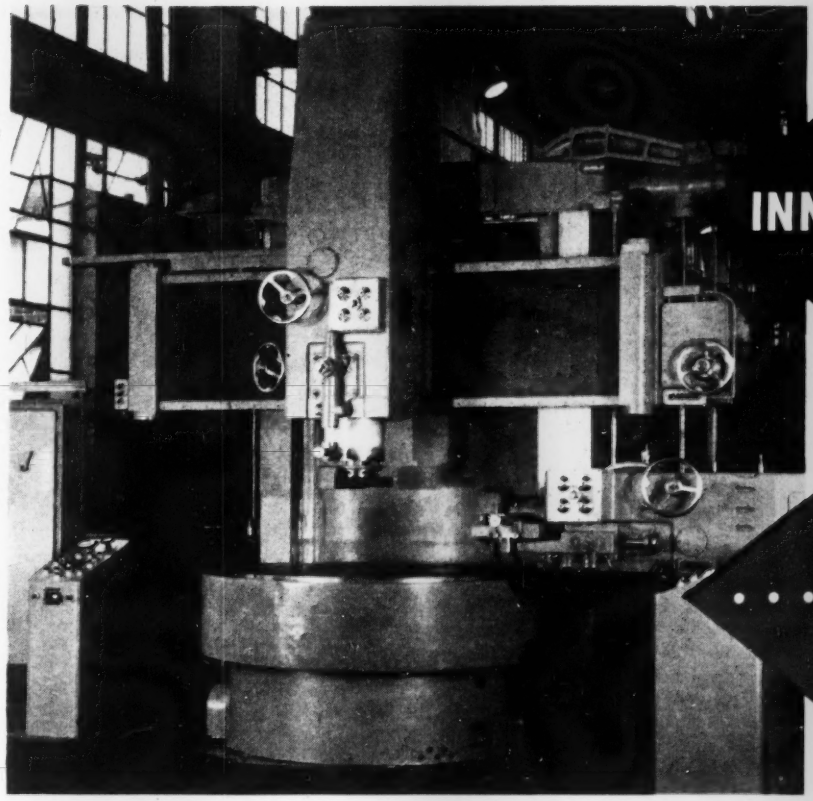
ACCURACY BOOSTS PRODUCTION

Abrasive Quality is Reflected in the Finish of Your Product



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VERTICAL CHUCKING GRINDING MACHINES

Your Grinding Jobs finished . . . Keep the Machine Paying its Way . . .

NOW . . .

Practical Versatility

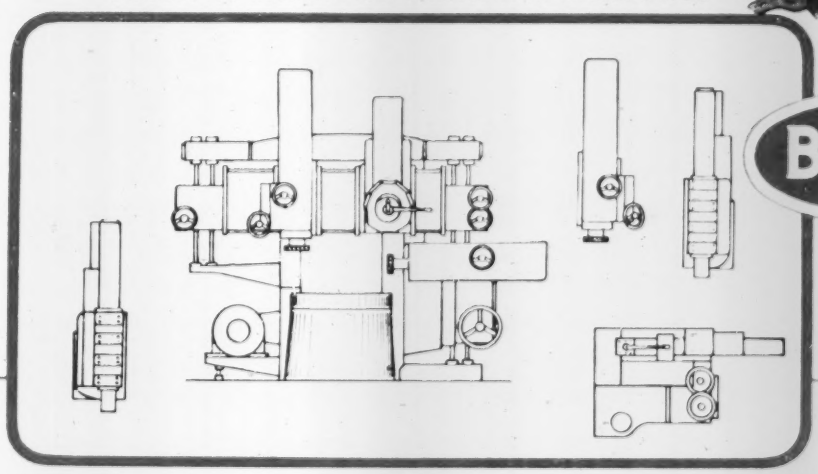
BY . . .

Grinding, Boring, Facing or Turning with several head combinations available.

ASSURED

Sufficient horsepower for regular machining cuts first . . . Grinding work next . . . on the SAME machine.

POSSIBLE HEAD COMBINATIONS on BULLARD VERTICAL CHUCKING GRINDING MACHINES

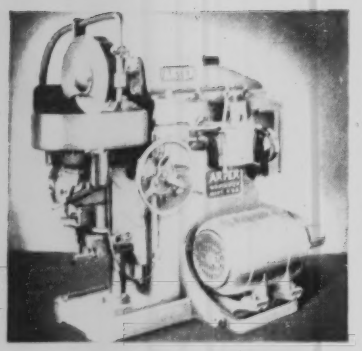


THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

ARTER *Precision*

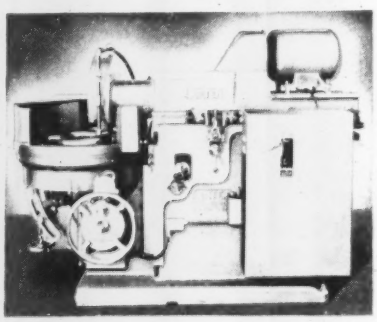
- **Rotary Surface Grinders**
- **Circular Cutter Grinders**
- **Plain Cylindrical and Internal Grinders**



Arter Rotary Surface Grinders are built in Models A, B and D — Models A and B only are described.

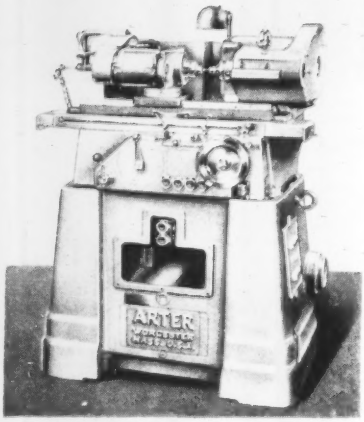
Model "A" Rotary Surface Grinders — Two sizes, 8" and 12" diameter electric magnetic chuck . . . . three chuck speeds . . . . for each speed, three wheel slide traverse speeds available . . . . wheel spindle-driven by 4" belt . . . . drive to the slide by a flat belt running over three-step pulleys . . . . wheel spindle mounted in straight-holed, split, adjustable bronze bearings . . . . end thrust taken on a collar running between bronze discs . . . . bearings positively oiled by throwers in the reservoirs adjacent to each bearing . . . . work table hung in a slide, mounted on dovetailed ways . . . . table can be tilted for grinding external tapers or bevels and internal tapers or reliefs . . . . chuck spindle runs in a self-centering, conical bearing at top and a straight-holed, adjustable bronze bearing at the bottom.

Model "B" Rotary Surface Grinders — in four chuck capacities — 20", 24", 30" and 40" . . . . mainly hydraulically operated, wheel slide being moved by a piston . . . . chuck driven primarily by hydraulic motor, and hydraulic means employed for automatic, work table elevating feed . . . . Vickers motor, pumps and valves . . . . magnetic chuck runs on flat circular track bearing . . . . rigid support work, regardless of weight, position on the chuck, or wheel pressure . . . . work table tiltable for grinding internal or external tapering surfaces . . . . oil tank for hydraulic system positioned on the floor behind the machine . . . . wheel spindle mounted at front in steel-backed, babbit-lined bearing, 3" diameter by 12" long . . . . rear bearing precision double-row ball bearing . . . . spindle pulley driven by multiple vee belts from a 10 h.p. motor . . . . extra equipment: motor-driven means for raising and lowering work table.



Model "103" Cylindrical Grinder — dual purpose external cylindrical and internal grinding machine . . . . can be had as external or internal grinder only . . . . convertible equipment at any time . . . . hydraulic table movement and hydraulic means for automatic in-feed of wheelhead through worm and worm wheel and screw . . . . work table, wheelhead and headstock swivelled for grinding angular work . . . . face grinding also is possible . . . . cross-feed operates automatically at either or both ends of the work table stroke even with both dogs at the minimum setting . . . . maximum feed is .0005", minimum is .0001" at each table reverse . . . . graduated knob controls the table speed. This and Model I G (below) are self contained, the coolant and oil tanks are within the base.

Model I G "103" Internal Grinder — arranged for internal grinding only . . . . has the same general construction and operating means as in the cylindrical grinder . . . . self contained wheelhead has a ¾ h.p. in-built motor with belt drive to either a 15,000 or 32,000 RPM spindle unit. Excello, Pope, Whitnon or other standard spindles, 3" O.D. can be used . . . . work spindle has a draw bar, with hand wheel attached and arranged to take 5-C collets.

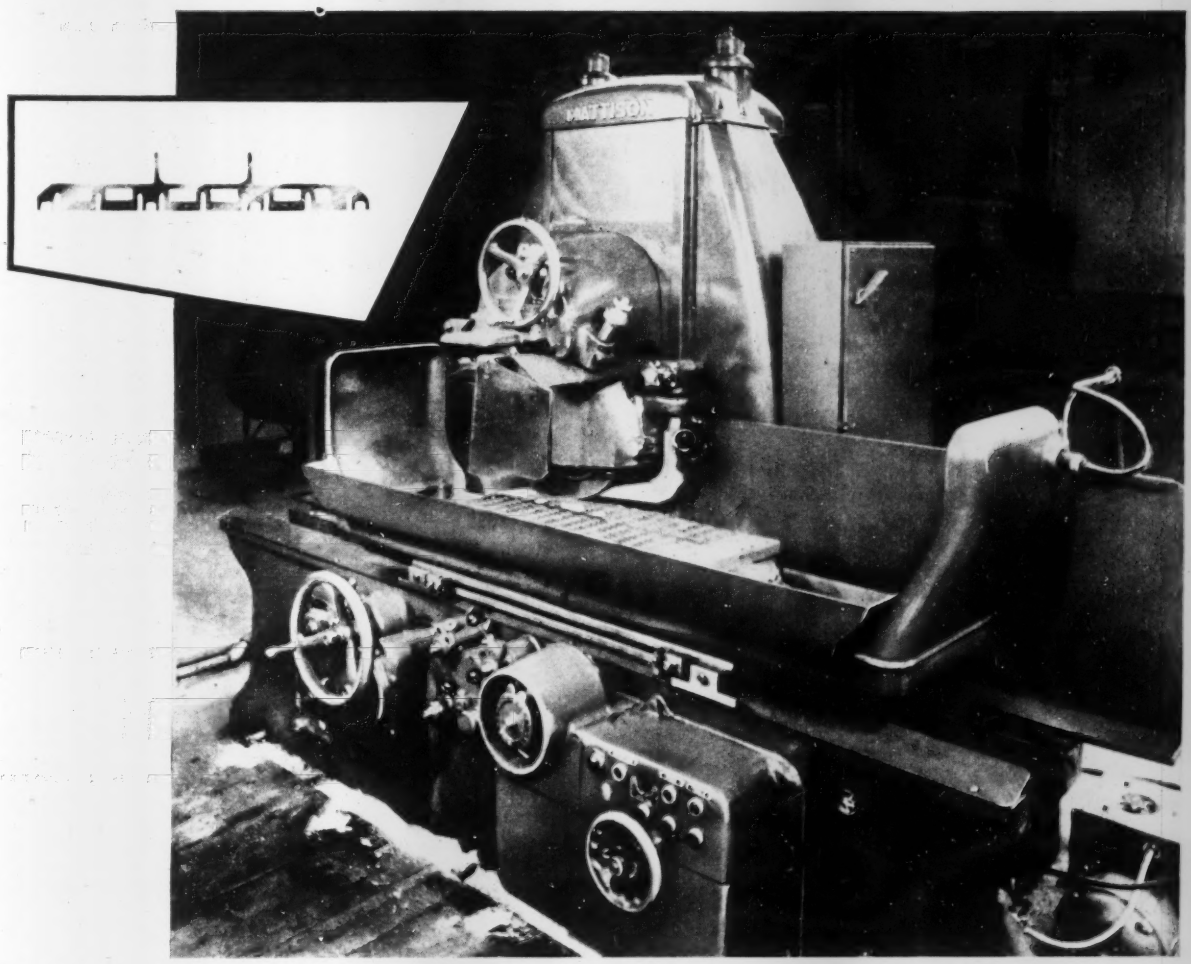


Other products: Carbide Tool Grinders, Piston Ring Grinders, Automatic Cylindrical Grinders, Contract Work.

Arter GRINDING MACHINE CO.

WORCESTER 5, MASSACHUSETTS

Agents in industrial centers in the United States and Canada



.020 THICK BLADES GROUND 440 AT A TIME ON MATTISON GRINDER FOR SUNBEAM CORPORATION

Here is an unusual grinding job at the Sunbeam Corporation Plant being perfo.med rapidly and accurately with the Mattison Grinder shown above. 440 Shavemaster blades only .020" thick are ground at one time at a considerable saving in time over previous method.

With the Mattison High-Powered Precision Surface Grinder you have the high power and rugged, double-column construction for rapid stock removal; large capacity which means more pieces of work per load; and the precision and sensitivity necessary for fine, high-quality finish and accuracy to close limits.

This combination not only enables you to step up production on small parts but permits grinding large work which previously could not be handled. Send for free circular containing complete information as well as numerous other examples of work ground on the Mattison Grinder.

MATTISON MACHINE WORKS

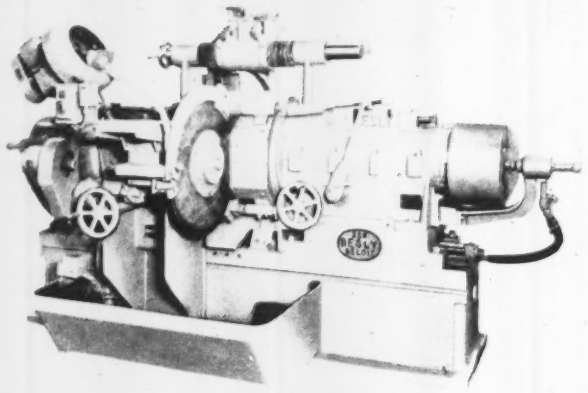
ROCKFORD • ILLINOIS

Get the Face Grinder that meets YOUR Needs!

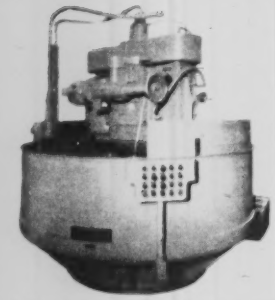
For grinding equipment that assures lowest possible unit costs—with high output of ground pieces held to close tolerances for flatness, finish, parellelism and other essential qualities, look to Besly.

Besly Grinders are individually engineered to handle an endless variety of sizes, shapes and materials.

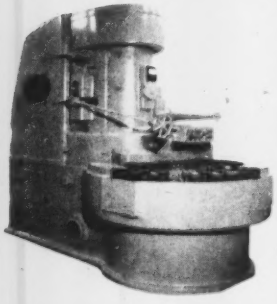
Ask us to analyze your grinding needs and make specific recommendations, or write for catalog No. G-54.



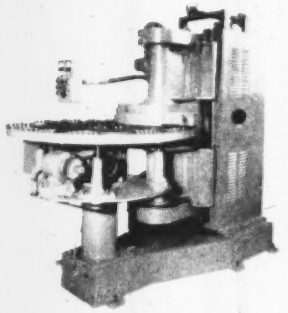
Besly double-horizontal spindle Disc Grinders available in five basic sizes with a wide range of feed arrangements for high production finishing of parallel surfaces.



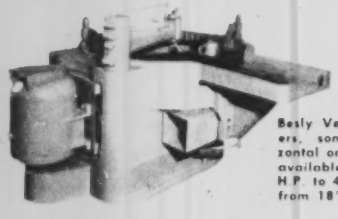
BESLY-BOWEN #710-18" 30 HP Grinder. Equipped with two rotary work tables with special fixtures or magnetic chucks, automatic cycle control mechanism. Hydraulic and electrical equipment conforming to J.I.C. Standards. Four basic models available ranging from 5 to 100 H.P.



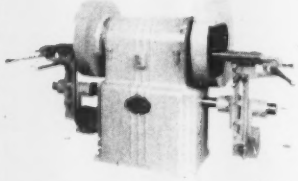
No. 953-36" Vertical Spindle Wet Grinder with push-button control of all operations. Continuously rotating feed wheel or fixture permits continuous production.



Besly No. 928-30/60 Double Vertical Spindle Dry Coil Spring Grinder equipped with a variable speed rotary unit and horizontal feed wheel.



Besly Vertical Spindle Grinders, sometimes called horizontal or "tub" grinders, are available in models from 5 H.P. to 40 H.P. to use wheels from 18" to 72" diameter.



BESLY #208-26" Horizontal Spindle Double Disc Dry Grinder. Arranged with geared lever feed tables and 15 HP motor.

BESLY-WELLES CORPORATION

Established as Charles H. Besly and Company in 1875
107 Dearborn Avenue, Beloit, Wisconsin

BESLY Taps, Drills, Tool Bits, Reamers and End Mills . . . High Speed Cutting Tools in a complete range of types and sizes.

"JOB-FITTED" ABRASIVE WHEELS

To get top production from your abrasive wheels specify Besly-Titan "job-fitted" wheels. They're individually formulated to the exact needs of the job. Job-fitting costs no more!

NOW - - - an improved water-mix base oil especially formulated for both cutting and grinding application

DASCO
SUPER SOLUBLE BASE

ONE phase of Stuart's continuous research program on metal-working oils and compounds has been directed toward the formulation of a better water-mix cutting and grinding fluid. A heavy duty type water-mixture that would improve machine efficiency on both classes of work, and which could be used at leaner mixtures than normally recommended for soluble oils.

FOR WATER-MIX CUTTING APPLICATIONS. A heavy duty water-mix cutting fluid base, capable of filling the gap between conventional soluble oils and straight cutting oils, must contain more than ordinary petroleum oil if superior performance is to be realized. The manufacture of Dasco Super Soluble Base incorporates a heavy duty base oil — widely known for its performance record on the toughest metalworking jobs.

The advantages gained from this unique feature include superior performance at leaner mixtures than other heavy duty water-mixes. Mixtures normally start at 40 to 1 for turning, drilling, milling, sawing, boring, reaming. Only on some surface broaching, and round hole broaching operations has it been necessary to use mixtures as rich as 15 to 1.

FOR WATER-MIX GRINDING APPLICATIONS. Cylindrical, surface, and centerless grinding operations call for a water-mixture with a higher detergency factor than that found in ordinary soluble oils. Better rust inhibiting and stability characteristics are required because of the leaner mixtures usually used for grinding. Dasco Super Soluble Base has been used for exceptionally long periods of time, at leaner mixtures than 100 to 1, the recommended starting mixture, with no problems due to rusting, separation or rancidity.

TWO WATER-MIXES BUILT INTO ONE. The combination of extra cutting value, high grinding value, excellent stability and great resistance to rancidity makes Dasco Super Soluble Base an ideal water-mix for both cutting and grinding — one that has been especially formulated to give top performance on both classes of work — at leaner mixtures than ordinarily recommended for other heavy duty products — and priced lower than normal for a product of such high quality. Send coupon for complete data.

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TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

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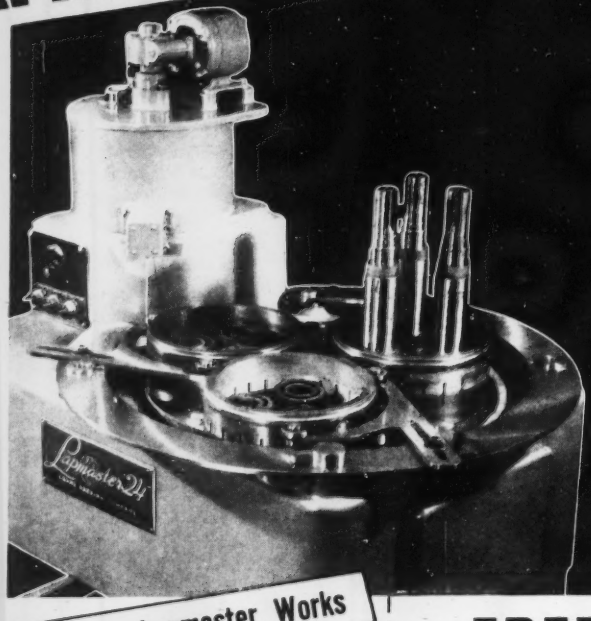
WHY YOU GET

Precision Flatness, Finish and Parallelity in Production Quantities . . .

WITH A LAPMASTER

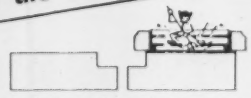


Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (.0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.

Check these features and investigate the possibilities for the Lapmaster in your plant.

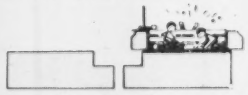
1. Operator requires no previous lapping experience.
2. Automatic timer provides controlled lapping cycle for production efficiency and allows time for pre-loading work-holders.
3. Simplicity of design allows ease of loading and unloading.
4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent compound and removed stock.
6. Precision laps identical parts or parts of various shapes, heights and materials in one cycle.
7. Self-conditioning lap plate eliminates down time for truing or replacement.

How the Lapmaster Works



The work being lapped causes wear on heavy cast iron lap plate.

As the work is wearing the lap, the conditioning rings are continually conditioning the lapping plate surface.



Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.

FREE DATA

Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today.

Crane Packing Company, Dept. S-11, 1805 Belle Plaine Ave., Chicago 13, Illinois

JOHN CRANE

CRANE PACKING COMPANY

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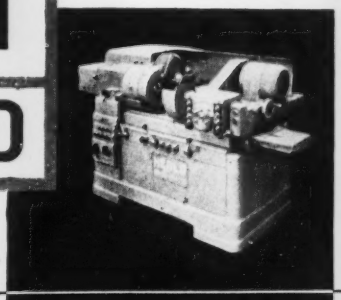
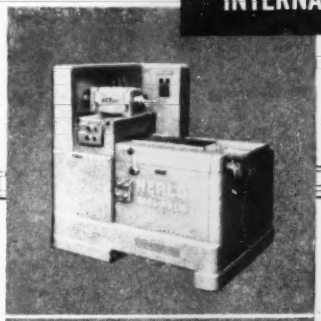
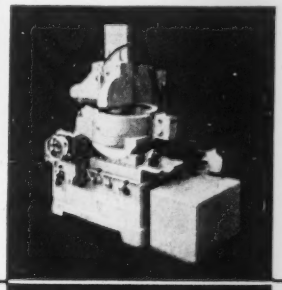


INTERNAL GRINDERS



BORE-MATICS



SURFACE GRINDERS

3 Ways to CUT PRECISION FINISHING COSTS

● Whether your products call for internal grinding, borizing or rotary surface grinding operations, there's a Heald machine that can help you do the job faster, easier and at lower cost — and with the highest accuracy and precision, too.

For these three complete lines of Heald machines have repeatedly *proved* their ability to speed production and cut unit costs — on long or short runs, simple or complex parts, singly or several at a time.

Remember — when it comes to precision finishing, IT PAYS TO COME TO HEALD.

THE HEALD MACHINE COMPANY

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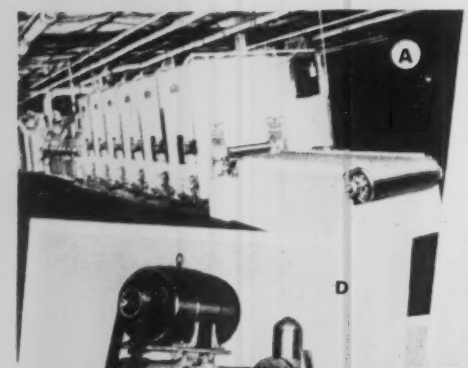
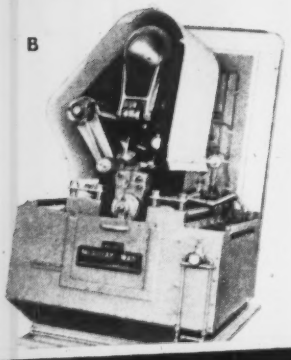
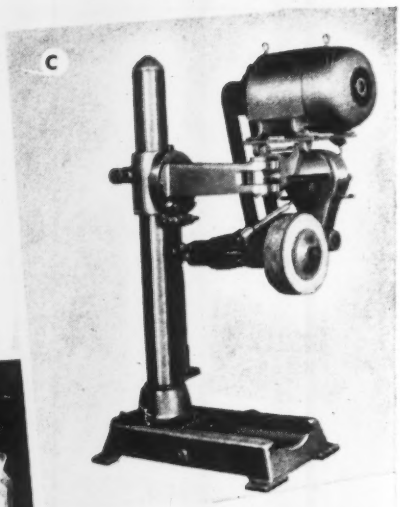
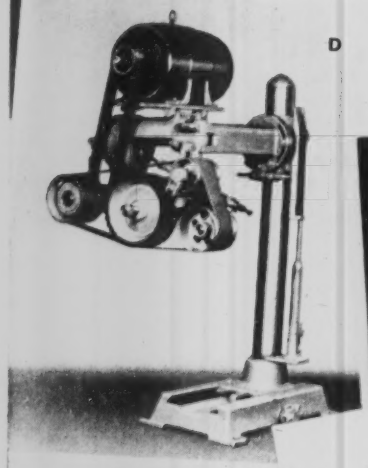
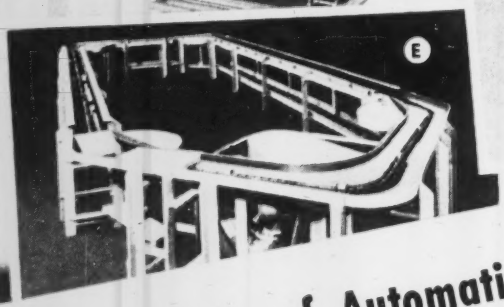
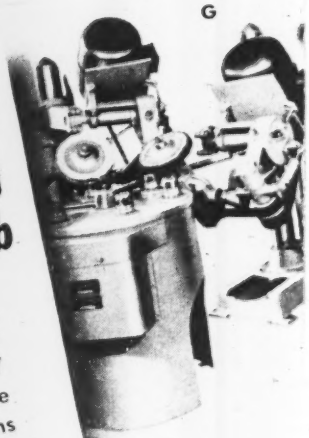


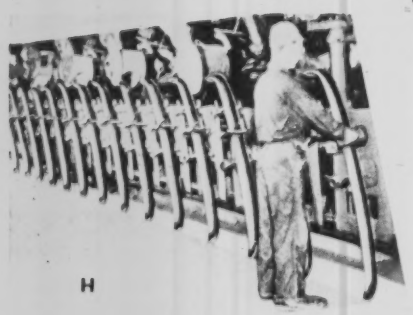


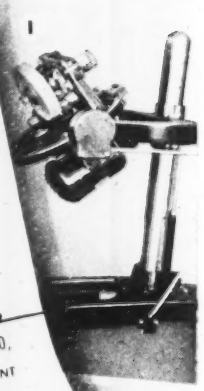


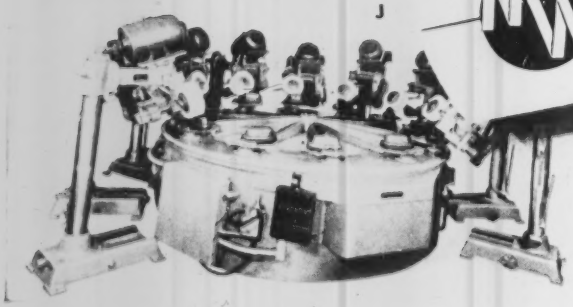


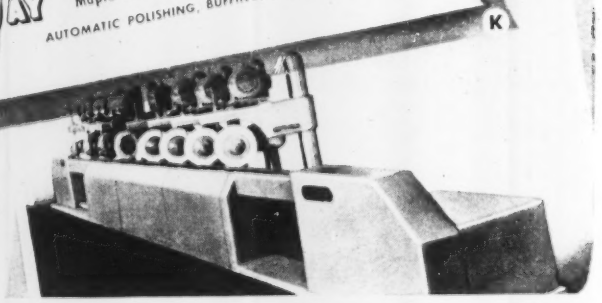












A complete line of Automatic Polishing, Buffing and Grinding Equipment engineered to the job

MURRAY-WAY means the "better way" in automatic buffing, polishing and grinding. Here we show a representative group of MURRAY-WAY equipment now in use in plants throughout the country. Even your toughest surfacing problems may be solved automatically and economically through MURRAY-WAY equipment and engineering experience.

(A) Six Micro-Polish Units in Series
(B) Micro-Polish Unit
(C) #60 Polishing Head
(D) 60 Series Belt Polishing Head
(E) Horizontal-Platen Conveyor
(F) Continuous Dial-Table
(G) Six Station Dial-Table
(H) Vertical-Platen Conveyor
(I) #50 Universal Polishing Head
(J) Indexing Dial Table
(K) Straight Line Conveyor

MURRAY-WAY

MURRAY-WAY CORP.

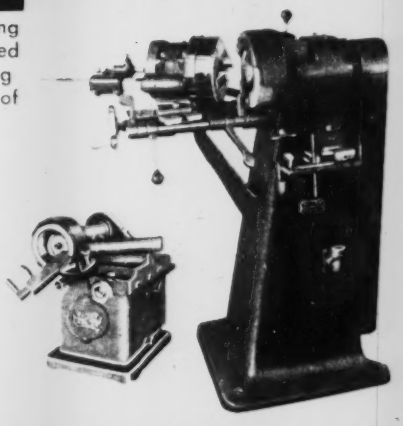
Maple Road E., Birmingham, Mich. P.O. Box 180,

AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

KEEP YOUR EYE on the OLIVER LINE

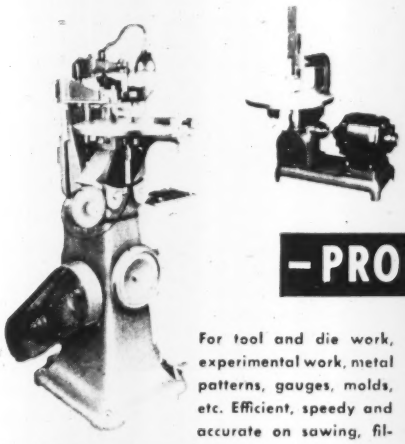
Precision Machines by Oliver of Adrian are backed by 40 years of outstanding performance. In thousands of installations throughout the world, Oliver has proved the efficiency, accuracy, and cost-cutting productivity of Oliver Machines. Long lasting Olivers are thoroughly and expertly engineered to give many years of dependable service . . . in the future as in the past.

OLIVER DRILL POINTERS



Sharpen drills to cut more accurately, last longer, and produce more holes. Olivers assure balanced cut, with each lip doing equal work, eliminating excessive drill costs and imperfect holes usually traced to improper grinding. No. 510 (far right) for drills ¼" to 3" —2-3-4 flute. No. 21 hand-operated Bench Grinder (right), for drills No. 57 to ½".

OLIVER DIE MAKING MACHINES

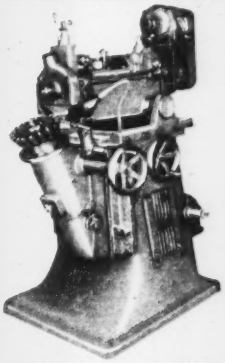


For tool and die work, experimental work, metal patterns, gauges, molds, etc. Efficient, speedy and accurate on sawing, filing and lapping operations.

Available in 5 models. Bench Model S-1 (above right)—Single Speed Die Maker for Tool Steel up to 1" thick. Heavy Duty Model (above left) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

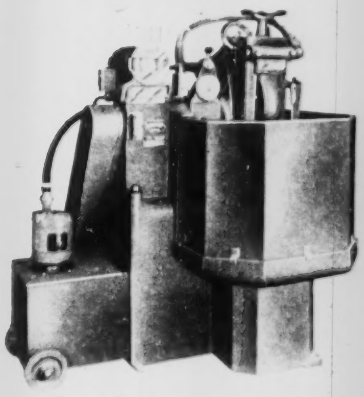
-PRODUCTION BOOSTING MACHINE TOOLS

OLIVER AUTOMATIC FACE MILL GRINDER



This fully automatic, hydraulically operated, CAM-CONTROLLED cutter grinder handles face mills from 10" to 21" in diameter. Machine for smaller cutters also available. Equally efficient on High Speed, Stellite, and Carbide Tipped Face Mills.

OLIVER 20" TEMPLATE TOOL BIT GRINDER

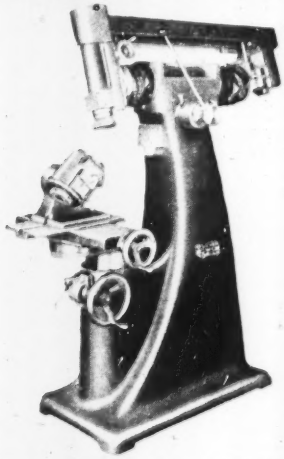


Developed for production sharpening of single point, lathe, planer and shaper tools (high speed and Carbides). Grinds on the periphery of a 20" wheel. Capacity up to 1½" wide by 1¼" high tools, from 0° to 20° clearance. (Grinds to a master template.)

TIME TESTED . . .

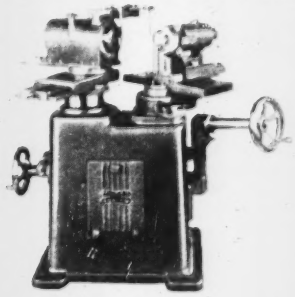
COST CUTTING

OLIVER ACE UNIVERSAL TOOL AND CUTTER GRINDER



Excels on High Speed and Tungsten-Carbide work. Requires no computation, yet handles a wide range of cutter grinding. Direct reading for clearances reduces fatigue—saves time on setup and grinding. 2 Models: Standard and Heavy Duty (illustrated).

OLIVER NO. 2 ARC FACE MILL GRINDER



A hand-operated machine designed for precision grinding of Face Mills 6" to 26" in diameter. Cutters may be sharpened either with or without radius. Radius may be varied from 0" to 2".

BE WISE - OLIVERIZE

Precision designed machines by Oliver of Adrian reduce Toolroom headaches, help substantially to maintain production schedules. Many Oliver machines do not require hard-to-get skilled labor. They cut labor costs because of accurate, speedy, and easy operation . . . reduce scrap . . . save costly tools and cutters.

Write today for complete, illustrated information. See our Catalog in Sweet's Directory

OLIVER INSTRUMENT CO.

1400 E. MAUMEE • ADRIAN, MICHIGAN

MACHINE TOOLS by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

MANUFACTURERS IN THIS SECTION

SECTION 5

Polishing and Buffing Machines

Acme Mfg. Co.—A5
Baldor Electric Co.—B3
J. G. Blount Co.—B30
The Bradford Machine Tool Co.—B36
Brown-Brockmeyer Co.—B43
Brown & Sharpe Mfg. Co.—B44
Buehler Ltd.—B46
Cincinnati Electrical Tool Co.—C9
Clair Mfg. Co. Inc.—C15
Clizbe Brothers Mfg. Co.—C28
Crozier Machine Tool Co.—C51
Curtis Machine Div.—C53
Delta Tool Div.—D6
Rockwell Mfg. Co.
Divine Brothers Co.—D16
Dyknex Corp.—D21
Ellward Mfg. Corp.—E10
Ex-Cell-O Corp.—E19
Excelsior Tool & Machine Co.—E20
Grinding & Polishing Machine Corp.—G25
Hammond Machinery Builders Inc.—H5
Hartford Special Machinery Co.—H10
Hill Acme Co.—H20
Hisey-Wolf Machine Co.—H22
Jefferson Machine Tool Co.—J3
Charles F. L'Hommedieu & Sons Co.—L20
Lima Electric Motor Co.—L21
Lippman Engineering Works—L24
Mead Specialties Co.—M14
Murray-Way Corp.—M40
Nicholas Equipment Co.—N16
Osborn Mfg. Co.—O6
Packer Machine Co.—P1
Porter-Cable Machine Co.—P12
Porter-McLeod Machine Tool Co. Inc.—P13
Production Machine Co.—P21
Queen City Machine Tool Co.—Q1
Royersford Foundry & Machine Co.—R21
Scandia Mfg. Co.—S4
Schauer Mfg. Corp.—S5
Standard Electrical Tool Co.—S30
United States Electrical Tool Co.—U4
Walker-Turner Div.—W6
Kearney & Trecker Corp.

POLISHING AND BUFFING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Bench Type

¼ hp, Double End H22
½ hp D6
½ hp, Single End H22
½ hp, Double End H22
¾ hp I.20
¾ hp S30
¾ hp, Polisher, Double End U4
¾ hp I.20
1 hp B36
1 hp, Buffing Machine G25
1 hp H5
1 hp, Single End H22
1 hp, Ball Bearing B30
1 hp B36
1 hp B43
1 hp C9
1 hp, Double End G25
1 hp, Buffing Machine G25
1 hp, Single End G25
1 hp H5
1 hp, Double End H22
1 hp, Light Duty I.20
1 hp, Pedestal I.20
1 hp, Pedestal, Double End Q1
1 hp S30
1 hp U4
1 hp, Buffer, Double End U4
1 hp, Polisher, Double End U4
2 hp, Ball Bearing B30
2 hp B36
2 hp B43
2 hp C9
2 hp, Single End G25
2 hp, Double End G25
2 hp, Buffing Machine G25
2 hp H5
2 hp, Double End H5
2 hp, Double End H22
2 hp, Light Duty I.20
2 hp, Pedestal, Double End Q1
2 hp S30
2 hp, Buffer, Double End U4
2 hp S30
2 hp, Double Spindle U4
2 hp S30
2 hp, Double Spindle U4
2½ hp S30
2½ hp, Double Spindle U4
2 10 hp, Double Spindle U4
3 hp S30
3 hp S30
3 hp, Ball Bearing B30
3 hp B36
3 hp B43
3 hp C9
3 hp, 2 motors C9
3 hp, Single End G25
3 hp, Double End G25
3 hp, Buffing Machine G25
3 hp each motor, Double End, Two Motors G25
3 hp H5
3 hp, Double End H5
3 hp each motor, 2-spindle H22
3 hp I.20
3 hp, Light Duty I.20
3 hp, Double Independent Spindle, Standard or Overhung, Front I.20
3 hp, Pedestal, Double End Q1
3 hp S30
3 hp U4
3 hp, Buffer, Double End U4
3½ hp, Double End H22
5 hp, Ball Bearing B30
5 hp B36
5 hp B43
5 hp C9
5 hp, 2 motors C9
5 hp, Single End G25
5 hp, Double End G25
5 hp, Buffing Machine G25
5 hp each motor, Double End, Two Motors G25
5 hp each motor, Buffing Machine, Double Motor G25
5 hp H5
5 hp, Double End H5
5 hp, Double End H22
5 hp each motor, 2-spindle H22
5 hp I.20
5 hp, Single Spindle, Overhung I.20
5 hp, Double Independent Spindle, Standard or Overhung, Front I.20
5 hp, 14" wheel I.24
5 hp, Pedestal, Double End Q1
5 hp S30
5 hp U4
5 hp, Buffer, Double End U4
6 hp, Double End H5
7½ hp, Ball Bearing B30
7½ hp B36
7½ hp C9
7½ hp, 2 motors C9
7½ hp, Single End G25
7½ hp, Double End G25
7½ hp, Buffing Machine G25
7½ hp each motor, Buffing Machine, Double Motor G25
7½ hp each motor, Double End, Two Motors G25
7½ hp H5
7½ hp, Double End H5
7½ hp, Double End H22
7½ hp each motor, 2-Spindle H22
7½ hp I.20
7½ hp, Single Spindle, Overhung I.20
7½ hp, Double Independent Spindle, Standard or Overhung, Front I.20
7½ hp, Pedestal, Double End Q1
7½ hp S30
7½ hp U4
10 hp B36
10 hp C9
10 hp, 2 motors C9
10 hp, Single End G25
10 hp, Double End G25
10 hp, Buffing Machine G25
10 hp each motor, Buffing Machine, Double Motor G25
10 hp each motor, Double End, Two Motors G25
10 hp H5
10 hp, Double End H5
10 hp, Double End H22
10 hp each motor, 2-spindle H22
10 hp I.20
10 hp, Single Spindle, Overhung I.20
10 hp, Double Independent Spindle, Standard or Overhung, Front I.20
10 hp, Pedestal, Double End Q1
10 hp S30
10 hp U4
15 hp B36
15 hp C9
15 hp, Single End G25
15 hp, Double End G25
15 hp, Buffing Machine G25
15 hp each motor, Buffing Machine, Double Motor G25
15 hp each motor, Double End, Two Motors G25
15 hp, Double End H5
15 hp, Double End H22
15 hp each motor, 2-spindle H22
15 hp I.20
15 hp, Single Spindle, Overhung I.20
15 hp, Double Independent Spindle, Standard or Overhung, Front I.20
15 hp S30
15 hp U4
20 hp, Single End G25
20 hp, Double End G25
20 hp, Buffing Machine G25
20 hp each motor, Buffing Machine, Double Motor G25
20 hp each motor, Double End, Two Motors G25
20 hp H5
20 hp, Single Spindle, overhung I.20
20 hp, Double Independent Spindle, Standard or Overhung, Front I.20
20 hp S30
20 hp U4
25 hp, Buffing Machine G25
25 hp each motor, Double End, Two Motors G25
25 hp H5
25 hp S30
30 hp each motor, Double End, Two Motors G25
30 hp S30
¼" to ⅜" cap, pins D21
1" dia. arbor, 1 hp, Pedestal, Double End I.21
1¼" dia. arbor, 2 hp, Pedestal, Double End I.21
1½" dia. arbor, 3 hp, Pedestal, Double End I.21
1½" dia. arbor, 5 hp, Pedestal, Double End I.21
2" to 14" cap, Polishing Machine, Double Header N16
2" to 14" cap, Finisher, Cutlery N16
4" collet cap, Die Polishing D21
18" to 42" cap, Finisher, Cutlery & Other N16
2½" dia. work, Finishing Machine, Cylindrical H5
9" dia. work, Finishing Machine, Cylindrical H5
4" belt, 10" dia. disk, Surfacing Machine, Belt and Disk, Pedestal W6
Rotary, Straight Line, Semiautomatic & Special A5
8" stroke P13
14" stroke P13
Automatic Brushing Machine, Special O6
Polishing Machines R21
3" lapping pins D21
3" cap D21
6" dia. wheel B3
8" dia. wheel B3
8" dia. wheel B46
10" dia. wheel B3
10" dia. wheel C28
12" dia. wheel C28
1" x 4" working cap B46
1" belt, 10" dia. disk, Surfacing Machine, Belt and Disk W6

Floor Type

⅛ hp, Ball Bearing B30
½ hp C9
½ hp, Double End H22
½ hp S30
½ hp, Polisher, Double End U4
¾ hp, Pedestal I.20
1 hp, Ball Bearing B30
1 hp B36
1 hp B43
1 hp C9
1 hp, Double End G25
1 hp, Buffing Machine G25
1 hp, Single End G25
1 hp H5
1 hp, Double End H22
1 hp, Light Duty I.20
1 hp, Pedestal, Double End Q1
1 hp S30
1 hp U4
1 hp, Buffer, Double End U4
1 hp, Polisher, Double End U4
2 hp, Ball Bearing B30
2 hp B36
2 hp B43
2 hp C9
2 hp, Single End G25
2 hp, Double End G25
2 hp, Buffing Machine G25
2 hp H5
2 hp, Double End H5
2 hp, Double End H22
2 hp, Light Duty I.20
2 hp, Pedestal, Double End Q1
2 hp S30
2 hp, Buffer, Double End U4
2 3 hp S30
2 5 hp, Double Spindle U4
2 5 hp S30
2 5 hp, Double Spindle U4
2 7½ hp S30
2 7½ hp, Double Spindle U4
2 10 hp S30
2 10 hp, Double Spindle U4
2 15 hp S30
2 20 hp S30
3 hp, Ball Bearing B30
3 hp B36
3 hp B43
3 hp C9
3 hp, 2 motors C9
3 hp, Single End G25
3 hp, Double End G25
3 hp, Buffing Machine G25
3 hp each motor, Double End, Two Motors G25
3 hp each motor, Buffing Machine, Double Motor G25
3 hp H5
3 hp, Double End H5
3 hp, Double End H22
3 hp each motor, 2-spindle H22
3 hp I.20
3 hp, Single Spindle, Overhung I.20
3 hp, Double Independent Spindle, Standard or Overhung, Front I.20
3 hp, Pedestal, Double End Q1
3 hp S30
3 hp U4
3 hp, Buffer, Double End U4
3 hp, Floor Type, Double End D16
3½ hp each motor, Floor Type, Double End, Two Motors D16
5 hp S5
5 hp, Floor Type, Double End D16
5 hp each motor, Floor Type, Double End, Two Motors D16
5 hp S5
7½ hp, Floor Type, Double End D16
7½ hp each motor, Floor Type, Double End, Two Motors D16
10 hp, Floor Type, Double End D16

Speed Lathes

⅛ hp C9
⅓ hp C9
⅓ hp S5
½ hp C9
½ hp S5
¾ hp C51
¾ hp S5
¾ hp to 2 hp B30
1 hp C9
1 hp, Chucking, Polishing H22
1 hp S5
1½ hp S30
2 hp C9
2 hp H22
2 hp S5
3 hp S30

1 hp, Bench Type, Double End D16
1 hp C9
1 hp S5
1½ hp, Bench Type, Double End D16
1½ hp, Floor Type, Double End D16
1½ hp B30
2 hp, Bench Type, Double End D16
2 hp, Floor Type, Double End D16
2 hp S5
3 hp, Bench Type, Double End D16

POLISHING AND BUFFING MACHINES

(Code number following each listing indicates manufacturer; key on page 82)

Speed Lathes

(Continued)

10 hp each motor, Floor Type, Double End, Two Motors ... D16
15 hp, Floor Type, Double End ... D16
15 hp each motor, Floor Type, Double End, Two Motors ... D16
20 hp, Floor Type, Double End ... D16
25 hp, Floor Type, Double End ... D16
30 hp, Floor Type, Double End ... D16
50 hp, Floor Type, Double End ... D16
⅝" cap ... C51
1" cap ... B44
1" cap ... C51
2" collet cap ... D21
11" swing, 36" bed length, Bench ... B30
11" swing, 36" bed length, Floor ... B30
11" swing, 48" bed length, Bench ... B30
11" swing, 48" bed length, Floor ... B30
11" swing, 60" bed length, Bench ... B30
11" swing, 60" bed length, Floor ... B30
11" swing, 72" bed length, Bench ... B30
11" swing, 72" bed length, Floor ... B30
11" swing, 84" bed length, Floor ... B30
12" swing, 48" bed length, Floor ... B30
12" swing, 60" bed length, Floor ... B30
12" swing, 96" bed length, Floor ... B30
13" swing, 60" bed length, Bench ... B30
13" swing, 60" bed length, Floor ... B30
13" swing, 72" bed length, Bench ... B30
13" swing, 72" bed length, Floor ... B30
13" swing, 96" bed length, Bench ... B30
13" swing, 96" bed length, Floor ... B30
13" swing, 120" bed length, Bench ... B30
13" swing, 120" bed length, Floor ... B30
15" swing, 1½ hp ... W6
16" swing, 48" bed length, Floor ... B30
16" swing, 60" bed length, Floor ... B30
16" swing, 72" bed length, Bench ... B30
16" swing, 72" bed length, Floor ... B30
16" swing, 96" bed length, Bench ... B30
16" swing, 96" bed length, Floor ... B30
16" swing, 120" bed length, Bench ... B30
16" swing, 120" bed length, Floor ... B30
16" swing, 144" bed length, Bench ... B30
16" swing, 144" bed length, Floor ... B30
18" swing, 48" bed length, Floor ... B30
20" swing, 96" bed length, Floor ... B30
24" swing, 96" bed length, Floor ... B30
Two Speed ... C51
Single Speed ... C51
Vacuum Type ... C51
Chuck Type ... C51

Abrasive Belt Drum & Disk

⅜" max. belt width, Die Polishing ... H10
½" wide belt ... E19
½" max belt width, Die Polishing ... H10
1" wide, 42" belt length, Vertical ... M14
1" to 2" belt width, Vertical ... P12
1" to 6" belt width ... P12
1" to 6" belt width, Wall Mounting ... P12
1" to 10" belt Width, Abrasive Belt, Contact Pad, Belt Conveyor Feed, One Side ... C53
1" to 10" belt width, Abrasive Belt, Belt Conveyor Feed, One Side ... C53
1" to 10" belt width, Abrasive Belt, Roll Feed, Flat Strip & Bar, One Side ... C53
12" to 10" belt width, Abrasive Belt, Roll Feed, Flat Strip & Bar, Two Side ... C53
1¾" dia., 40" long ... C15
2" belt width, Horizontal or Vertical ... P12
2½" belt, Bench, Grinding ... H5
2½" belt, Floor, Grinding ... H5
2½" belt width, Horizontal ... P12
2½" x 60" belt ... G25
4" belt width, Abrasive Belt ... C53
4" belt, Bench, Grinding ... H5
4" belt, Floor, Grinding ... H5
4" belt width, Vertical or Horizontal ... P12
4" belt width, Vertical ... P12
4" belt width, work to 2¾" dia., Centerless ... P12
4" belt, 10" dia. disk, Surfacing Machine, Belt and Disk, Bench & Pedestal ... W6
4" x 36¼" ... E10
6" belt, Floor, Grinding ... H5
6" belt, Contour, Floor ... H5
6" pulley ... P12
6" pulley, Wall Mounting ... P12
6" belt width, Vertical ... P12
6" belt width, Horizontal or Vertical ... P12
6" x 48" ... E10
6" x 48" and 14" disk ... E10
7⅞" x 14¾" table, Belt Type, Tilting Table ... D6
8" belt width, Vertical ... P12
8" belt, 36" x 80" table, Horizontal, Hand Feed ... J3
8" x 61" ... E10
8" x 61" and 15" disk ... E10
9" dia., 40" long rolls, Flat or Contoured Surfaces ... C15
9" belt width ... P21
10" belt width, Abrasive Belt, Roll Feed, Coil Strip, One Side ... C53
10" belt width, Vertical, Horizontal ... P12
12" disk, Disk Type ... D6
14" belt width, Abrasive Belt, Roll Feed, Coil Strip, One Side ... C53
14" belt width, Abrasive Belt, Platen Type ... C53
14" belt width ... P21
20" belt width ... P21
24" wide, Two Roll Vertical ... H20
30" wide, Two Roll Vertical ... H20
36" wide, Two Roll Vertical ... H20
40" work area width, Spoon & Fork ... C15
48" wide, Two Roll Vertical ... H20
48" wide, 10' long, Two Roll Vertical ... H20
48" wide, 12' long, Two Roll Vertical ... H20
48" wide, 14' long, Two Roll Vertical ... H20
48" wide, 16' long, Two Roll Vertical ... H20
60" wide, Two Roll Vertical ... H20
60" wide, 10' long, Two Roll Vertical ... H20
60" wide, 12' long, Two Roll Vertical ... H20
60" wide, 14' long, Two Roll Vertical ... H20
60" wide, 16' long, Two Roll Vertical ... H20
38" work rack, Necking & Shoulder-ing on Spoons and Knives ... C15
Spoon & Fork Handles & similarly curved items ... C15
Rotary, Straight Line, Semiautomatic & Special ... A5

Swing Frame

4" swing, 14" dia. wheel ... J3
12" x 3" wheel ... G25
14" x 3" wheel ... G25
16" x 3" wheel, 7½ hp ... G25
18" x 3" wheel ... G25
18" x 6" wheel ... G25

Sheet Metal Polishing

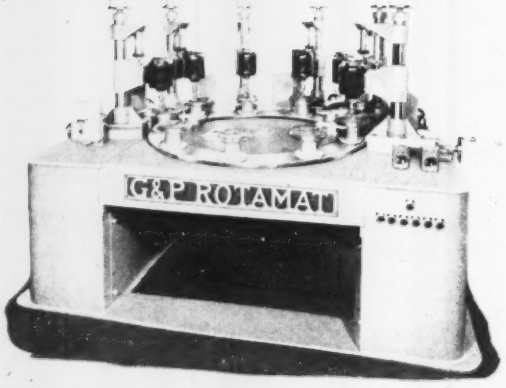
Up to 6" widths and specials, Adj. Floating Head Type ... A5
48" x 144" sheets ... E20
50" max. width, Flat Strip or Sheet Polisher ... M10
Up to 72" widths and specials ... A5
Special, Heavy Duty ... D16
Double Roll ... P1

Multiple Head Polishing & Others

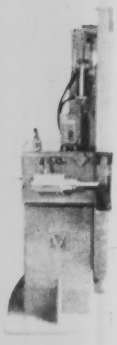
1½" dia. cylindrical, Polishing Machine, Centerless ... P21
6" dia. cylindrical, Polishing Machine, Centerless ... P21
3" work cap., Thread Burnishing ... S4
1, 2, 3 heads, Rotary Indexing ... D16
2 to 14 wheels ... E20
6 spindle, Rotary, Automatic ... H5
8 spindle, Rotary, Automatic ... H5
14" dia. wheels ... E20
16" dia. wheels ... E20
½ hp, Metallographic ... C9
7½ hp, Round Column, Universal Head ... M10
10 hp, Abrasive Belt Head, Round Column ... M10
15 hp, Round Column, Universal Head ... M10
25 hp, Round Column, Universal Head ... M10
Rotary Table ... P1
Rotary, Straight Line, Semiautomatic & Special ... A5
Straight Line ... D16
Straight Line Conveyor ... P1

If Your Problem's Grinding, Polishing, Buffing or Deburring—Maybe we can help!

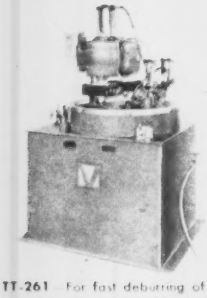
The machines shown are "in service" on the production lines of nationally known companies (facts and figures gladly provided on request). All bear the famous "Marschke" name—symbol of quality materials and workmanship for nearly half a century. They were designed and produced here at "G & P" to do jobs that could not be done—or only inadequately, inefficiently and uneconomically done—by existing machines. Designing and manufacturing unique machines for unusual grinding, polishing, buffing and deburring operations is a "G & P" specialty.



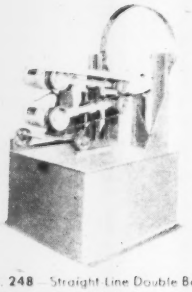
G & P Rotamat—A Multiple Station Turntable Machine for automatic polishing, deburring and descaling operations.



HS-180—Pneumatically Tensioned Abrasive Belt Grinder & Polisher—for turbine blades.

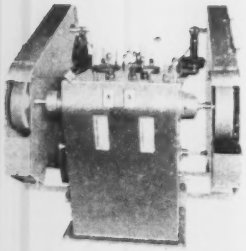


TT-261—For fast deburring of jet engine stator rings and half rings.

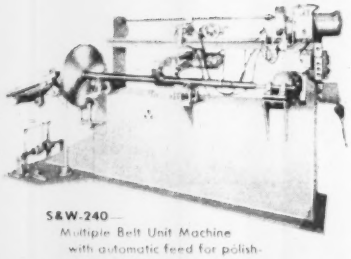


No. 248—Straight Line Double Belt Grinder & Polisher for weld and scale removal.

TT-234—Turntable Machine—for polishing the faces of jet turbine and other discs.



3W-168—Self-Contained, Variable Speed, Pneumatically Tensioned Double Belt Grinder & Polisher.



S&W-240—Multiple Belt Unit Machine with automatic feed for polishing turbine wheel and shaft assembly.

WRITE, WIRE OR PHONE

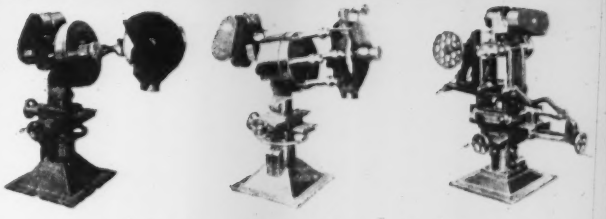
Grinding and Polishing Machinery Corp.

2530-K Winthrop Avenue • Indianapolis 5, Indiana

ACME *Automatics* PUT POLISHING *and* BUFFING OPERATIONS *on a low cost production basis . . .*

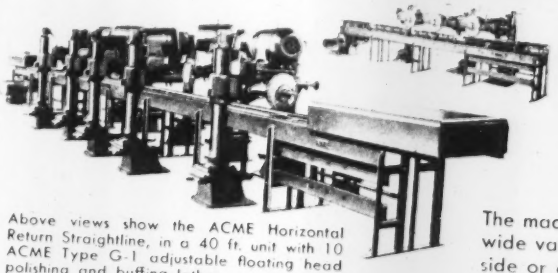
ACME *Semi-Automatics*

ACME Semi-Automatics are built to "deliver the goods." They can be fully relied upon to cut finishing costs, maintain production levels and stand up under long hours of operation!



The three ACME Semi-Automatics above are from left to right, the ACME A-2, a 2 spindle hand indexing machine for polishing and buffing cylindrical parts up to 12" diameter . . . the ACME L-4, a 4 spindle automatic indexing machine with a normal range of 250 to 400 indexes per hour . . . and the ACME D-10, an oscillating machine for finishing out of round parts. These machines are proved producers.

WRITE FOR CATALOG ILLUSTRATING WIDE RANGE OF TYPES



Above views show the ACME Horizontal Return Straightline, in a 40 ft. unit with 10 ACME Type G-1 adjustable floating head polishing and buffing lathes . . . and a 20 ft. unit with 3 ACME Type G-3 lathes.

ACME *Straight Lines*

ACME Straightlines provide effective solutions to many finishing problems. ACME progressive experience and engineering assure dependable performance at high production levels.

The machine illustrated is unusually versatile and adaptable to a wide variety of work. It may be loaded or unloaded from either side or either end. Polishing and buffing heads may be used on either or both sides and may vary in number to suit the required production and finish.

WRITE FOR OUR STRAIGHTLINE CATALOG ILLUSTRATING OTHER TYPES

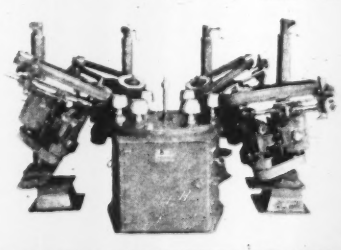
ACME *Rotary Automatics . . .*

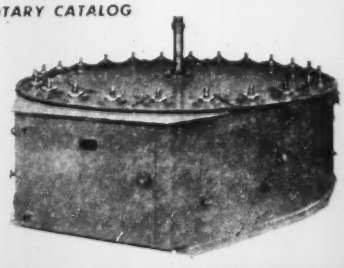
ACME 40" Rotary with 6 station indexing table and 4 ACME Type G-1 lathes with belt arm attachment. One second indexing time . . . up to 1800 indexes per hour. Acme Indexing Rotaries are available in table sizes from 18 in. to 10 ft. diameter.

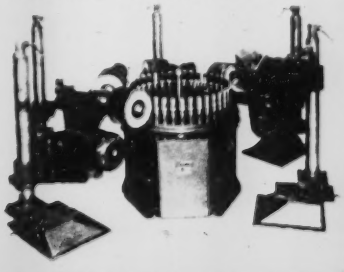
ACME 10 ft. Combination Rotary . . . for continuous operation using 24 continuously revolving spindles or for 12 station indexing operation using every other spindle. One second indexing time . . . up to 1200 indexes per hour.

ACME 50" Continuous Rotary Automatic with 40 spindles equipped with 4 Acme Type G-3 heavy duty 15 H.P. polishing and buffing lathes with inverted spindles. ACME Continuous Rotaries are available with tables up to 24 ft. diameter.

WRITE FOR ROTARY CATALOG







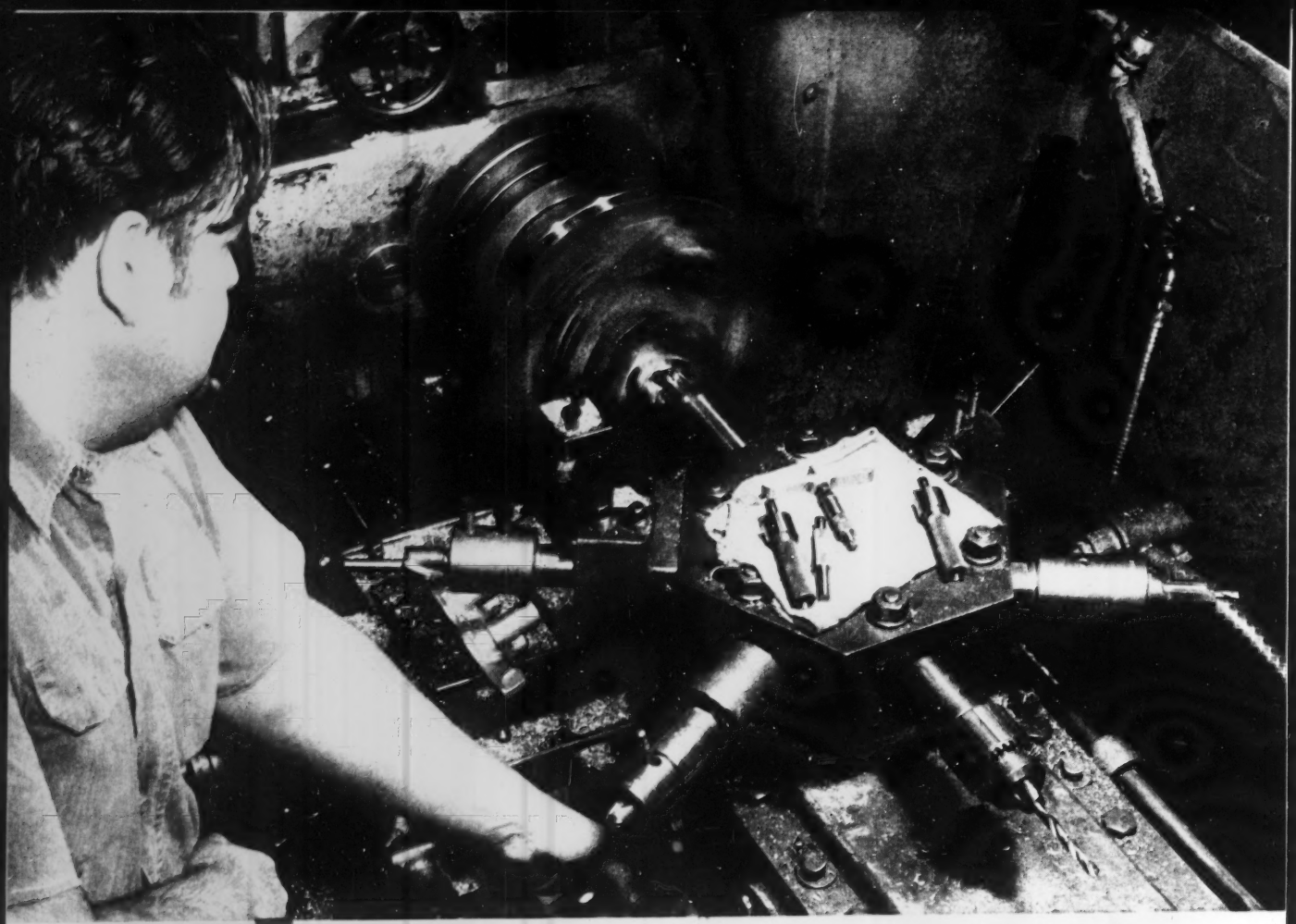
for POLISHING • BUFFING
GRINDING • MICRO-FINISHING
DE-BURRING • WIRE BRUSHING

SPECIAL MACHINERY — AUTOMATIC BUFFING MACHINES

ACME *Manufacturing Co.*

Builders 1400 E. 9 MILE RD., DETROIT 20 (Ferndale) MICH.

OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR NEARLY HALF A CENTURY



MANUFACTURERS IN THIS SECTION

The American Tool Works Co.—A17
Atlas Press Co.—A21
Axelson Mfg. Co.
Div. of Pressed Steel Car Co. Inc.—A26
The Baird Machine Co.—B1
Baldwin-Lima-Hamilton Corp.—B4
Bardons & Oliver Inc.—B7
Barney Machinery Co.—B10
Blaw-Knox Co.—B28
The Boye & Emmes Machine Tool Co.—B35
The Bradford Machine Tool Co.—B36
Brown & Sharpe Mfg. Co.—B44
J. W. Bullard & Sons Inc.—B50
Bullard Co.—B51
Cincinnati Lathe & Tool Co.—C11
Cleveland Automatic Machine Co.—C20
Cleveland Hobbing Machine Co.—C23
Cone Automatic Machine Co. Inc.—C34
Consolidated Machine Tool Corp.—C36
James Coulter Machine Co.—C41
Crankshaft Machine Co.—C46
Clausing Div.—C54
Continental Foundry & Machine Co.—C56
F. W. Derbyshire Inc.—D7
Detroit Cam & Tool Co.—D10
Elgin Tool Works—E9
Enterprise Co.—E15
Gisholt Machine Co.—G10
George Gorton Machine Co.—G14
Goss & De Leeuw Machine Co.—G15
Greenlee Brothers & Co.—G22
Hardinge Brothers Inc.—H9
Hendey Machine Co.—H15
Hiorth Lathe & Tool Co.—H23
Hyde Park Foundry & Machine Co.—H30
Jones & Lamson Machine Co.—J5
R. K. Leblond Machine Tool Co.—L10
Lehmann Machine Co.—L15
Louis Levin & Son Inc.—L19
Lipe-Rollway Corp.—L23
Lodge & Shipley Co.—L26
Logan Engineering Co.—L27
Mackintosh-Hemphill Co.—M1

SECTION 6

Lathes

C & E Marshall Co.—M5
McIlvanie Machine Works—M12
Mesta Machine Co.—M18
Monarch Machine Tool Co.—M32
Morey Machinery Co. Inc.—M34
Motch & Merryweather Machinery Co.—M37
National Acme Co.—N1
Nebel Machine Tool Co.—N6
New Britain-Gridley Machine Div.,
New Britain Machine Co.—N7
Oster Mfg. Co.—O5
Porter-McLeod Machine Tool Co. Inc.—P13
Potter & Johnson Co.
Sub. Pratt & Whitney Div.,
Niles-Bement-Pond—P14
Potter Tool & Machine Works Inc.—P15
Pottstown Machine Co.—P16
Pratt & Whitney Div.,
Niles-Bement-Pond Co.—P17
Production Machinery Development Co.—P22
Reed-Prentice Corp.—R3
Reid Brothers Co. Inc.—R6
Rivett Lathe & Grinder Inc.—R11
Rockford Machine Tool Co.—R14
Seneca Falls Machine Co.—S8
Sheldon Machine Co.—S10
Sidney Machine Tool Co.—S13
Simons Machine Tool Corp.—S15
Sloan & Chace Mfg. Co. Inc.—S20
Sommerfeld Machine Co.—S24
South Bend Lathe Works—S25
Sparks Machine Tool Corp.—S27
Springfield Machine Tool Co.—S28
William K. Stamets Co.—S29
Stark Tool Co.—S36
John B. Stevens Co.—S38
Sundstrand Machine Tool Co.—S43
H. P. Townsend Mfg. Co.—T14
United Engineering & Foundry Co.—U2
Wade Tool Co.—W1
Wadell Equipment Co.—W2
Warner & Swasey Co.—W9
Waterbury Farrel Foundry & Machine Co.—W10
Western Machine Tool Works—W16
Wickes Bros.—W19
Youngstown Foundry & Machine Co.—Y2

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Bench Lathes

Plain

3 9/2" swing, 3/8" collet cap...L19
3 9/2" swing, 5/8" collet cap...L19
3 9/4" swing, 4¾" cc, Watchmaker's ...D7
4" swing, 7" cc ...M5
4 7/2" swing, 7½" cc, Watchmaker's ...D7
4 7/2" swing, 10½" cc, Watchmaker's ...D7
4 7/2" swing, 11½" cc, Watchmaker's ...D7
5" swing ...S20
5½" swing, 6" cc ...S36
5½" swing, 12" cc ...S36
6 7/5" swing, 12" cc, Instrument ...D7
7" swing, 12" cc ...S20
7" swing, 14" cc, Pedestal Cabinet ...W1
7" swing, 15" cc, Pedestal Cabinet ...W1
7" swing, 16" cc ...P15
7" swing, 17" cc ...E9
7" swing, 18" cc ...S20
7" swing, 18" cc ...S36
8½" swing, 18" cc, 5/8" collet ...H23
8½" swing, 18" cc, 3/4" collet ...H23
8½" swing, 18" cc, 1" collet ...H23
8½" swing, 18" cc, 1⅛" collet ...H23
9" swing, 16" to 25" cc, Toolroom ...S25
9" swing, 17" cc ...E9
9" swing, 17" cc, 1" collet...H9
9" swing, 18" cc ...R11
9" swing, 20" cc ...S36
10" swing, 14¼" to 28⅛" cc, Toolroom ...S25
12" swing, 20" cc ...S36

Screw Cutting

6" swing, 18" cc, Back-geared ...A21
7" swing, 17" cc, Pedestal Cabinet ...W1
8½" swing, 18" cc ...R11
8½" swing, 24" cc, Pedestal Cabinet ...W1
9" swing, 16" to 31" cc ...S25
10" swing, 14¼" to 34¼" cc...S25
10" swing, 20" cc, 1" collet...H9
10" swing, 24" cc, Back-geared ...A21
10" swing, 24" cc ...L27
10" swing, 31" cc ...L27
10" swing, 36" cc, Back-geared ...A21
10½"/8 swing, 26" cc ...S10
10½" swing, 36" cc ...S10
11" swing, 24" cc ...L27
11" swing, 35" cc ...S10
11" swing, 36" cc ...L27
11¼" swing, 35" cc ...S10
12" swing, 24" cc, Back-geared ...C54
12" swing, 36" cc, Back-geared ...C54
12" swing, 48" cc, Back-geared ...C54
13" swing, 18" cc ...L10
13" swing, 30" cc ...L10
13" swing, 42" cc ...L10
13" swing, 54" cc ...L10
13" swing, 66" cc ...L10
13" swing, 78" cc ...L10
13" swing, 90" cc ...L10
13½" swing, 35" cc ...S10
13½" swing, 48" cc ...S10

Light Duty Floor Lathes

Engine

9" swing, 16" to 34" cc ...S25
10" swing, 14¼" to 34¼" cc...S25
10" swing, 20" cc, Precision Manufacturing...M32
10" swing, 24" cc ...C11
10" swing, 24" cc ...L27
10" swing, 30" cc ...C11
10" swing, 31" cc ...L27
10" swing, 36" cc ...C11
11" swing, 24" cc ...L27
11" swing, 36" cc ...L27
12" swing, 23" cc ...L27
12" swing, 30" cc ...H15
12" swing, 35" cc ...L27
12" swing, 42" cc ...H15
12" swing, 54" cc ...H15
12½" swing, 18" cc ...C11
12½" swing, 24" cc ...C11
12½" swing, 30" cc ...C11
12½" swing, 36" cc ...C11
12½" swing, 42" cc ...C11
12½" swing, 48" cc ...C11
12½" swing, 60" cc ...C11
13" swing, 16¼" to 52¼" cc...S25
13" swing, 18" cc ...L10
13" swing, 30" cc ...L10
13" swing, 30" cc ...M32
13" swing, 30" cc, Precision...M32
13" swing, 42" cc ...L10
13" swing, 54" cc ...L10
13" swing, 54" cc ...M32
13" swing, 54" cc, Precision...M32
13" swing, 66" cc ...L10
13" swing, 78" cc ...L10
13" swing, 78" cc ...M32
13" swing, 90" cc ...L10
13" swing, 102" cc ...L10
13" swing, 102" cc ...M32
13" swing, 114" cc ...L10
13" swing, 126" cc ...M32
13" swing, 126" cc ...L10
13" swing, 138" cc ...L10
13" swing, 150" cc ...L10
13" swing, 162" cc ...L10
14" swing, 30" cc ...H15
14" swing, 42" cc ...H15
14" swing, 54" cc ...H15
14" swing, 66" cc ...H15
14½" swing, 24⅜" to 60⅛" cc ...S25
15" swing, 18" cc ...L10
15" swing, 24" cc ...C11
15" swing, 30" cc ...C11
15" swing, 30" cc ...L10
15" swing, 36" cc ...C11
15" swing, 42" cc ...C11
15" swing, 42" cc ...L10
15" swing, 48" cc ...C11
15" swing, 54" cc ...C11
15" swing, 54" cc ...L10
15" swing, 60" cc ...C11
15" swing, 66" cc ...L10
15" swing, 72" cc ...C11
15" swing, 78" cc ...L10
15" swing, 84" cc ...C11
15" swing, 90" cc ...L10
15" swing, 102" cc ...C11
15" swing, 102" cc ...L10
15" swing, 114" cc ...C11
15" swing, 108" cc ...C11
15" swing, 114" cc ...L10
15" swing, 126" cc ...L10
15" swing, 138" cc ...L10
15" swing, 150" cc ...L10
15" swing, 162" cc ...L10
16" swing, 30" cc ...M32
16" swing, 33¼" to 105¼" cc ...S25
16" swing, 36" cc ...P13
16" swing, 54" cc ...M32
16" swing, 60" cc ...P13
16" swing, 78" cc ...M32
16" swing, 84" cc ...P13
16" swing, 102" cc ...M32
16" swing, 126" cc ...M32
16" swing, 150" cc ...M32
16" swing, 174" cc ...M32
16" to 24" swing, 30" to 102" cc, Raised Head ...S25
16½" swing, 30" cc, 72" bed...R14
16½" swing, 54" cc, 96" bed...R14
16½" swing, 78" cc, 120" bed ...R14
16½" swing, 102" cc, 144" bed ...R14
17" swing, 30" cc ...L10
17" swing, 42" cc ...L10
17" swing, 54" cc ...L10
17" swing, 66" cc ...L10
17" swing, 78" cc ...L10
17" swing, 90" cc ...L10
17" swing, 102" cc ...L10
17" swing, 114" cc ...L10
17" swing, 126" cc ...L10
17" swing, 138" cc ...L10
17" swing, 150" cc ...L10
17" swing, 162" cc ...L10
17" swing, 174" cc ...L10
18" swing, 24" cc ...C11
18" swing, 30" cc ...C11
18" swing, 42" cc ...C11
18" swing, 54" cc ...C11
18" swing, 60" cc ...C11
18" swing, 72" cc ...C11
18" swing, 84" cc ...C11
18" swing, 102" cc ...C11
18" swing, 108" cc ...C11
18" swing, 114" cc ...C11
18⅛" swing, 55" to 144" cc...M12
18½" swing, 30" cc, 72" bed ...R14
18½" swing, 54" cc, 96" bed ...R14
18½" swing, 78" cc, 120" bed ...R14
18½" swing, 102" cc, 144" bed ...R14
19" swing, 30" cc ...L10
19" swing, 42" cc ...L10
19" swing, 54" cc ...L10
19" swing, 66" cc ...L10
19" swing, 78" cc ...L10
19" swing, 90" cc ...L10
19" swing, 102" cc ...L10
19" swing, 114" cc ...L10
19" swing, 126" cc ...L10
19" swing, 138" cc ...L10
19" swing, 150" cc ...L10
19" swing, 162" cc ...L10
19" swing, 174" cc ...L10
20" swing, 30" cc ...L26
20" swing, 48" cc, Medium Duty ...A17
20" swing, 48" cc, Medium Duty ...A26
20" swing, 48" cc ...M32
20" swing, 54" cc ...L10
20" swing, 54" cc ...L26
20" swing, 72" cc, Medium Duty ...A26
20" swing, 72" cc ...M32
20" swing, 78" cc ...L10
20" swing, 78" cc ...L26
20" swing, 96" cc, Medium Duty ...A26
20" swing, 96" cc ...M32
20" swing, 102" cc ...L10
20" swing, 102" cc ...L26
20" swing, 120" cc, Medium Duty ...A26
20" swing, 120" cc ...M32
20" swing, 126" cc ...L10
20" swing, 126" cc ...L26
20" swing, 144" cc, Medium Duty ...A26
20" swing, 144" cc ...M32
20" swing, 150" cc ...L10
20" swing, 150" cc ...L26
20" swing, 165" cc, Medium Duty ...A26
20" swing, 168" cc ...M32
20" swing, 174" cc ...L10
20" swing, 174" cc ...L26
20" swing, 192" cc, Medium Duty ...A26
20" swing, 192" cc ...M32
20" swing, 198" cc ...L10
20" swing, 216" cc ...M32
20" swing, 222" cc ...L10
20" swing, 246" cc ...L10
21" swing, 36" cc ...L10
21" swing, 48" cc ...L10
21" swing, 60" cc ...L10
21" swing, 72" cc ...L10
21" swing, 84" cc ...L10
21" swing, 96" cc ...L10
21" swing, 108" cc ...L10
21" swing, 120" cc ...L10
21" swing, 132" cc ...L10
21" swing, 144" cc ...L10
21" swing, 156" cc ...L10
21" swing, 168" cc ...L10
21" swing, 180" cc ...L10
21" swing, 192" cc ...L10
21" swing, 204" cc ...L10
21" swing, 216" cc ...L10
24" swing, 36" cc ...L10
24" swing, 48" cc ...L10
24" swing, 60" cc ...L10
24" swing, 72" cc ...L10
24" swing, 84" cc ...L10
24" swing, 96" cc ...L10
24" swing, 108" cc ...L10
24" swing, 120" cc ...L10
24" swing, 132" cc ...L10
24" swing, 144" cc ...L10
24" swing, 156" cc ...L10
24" swing, 166" cc ...L10
24" swing, 180" cc ...L10
24" swing, 192" cc ...L10
24" swing, 204" cc ...L10
24" swing, 216" cc ...L10
25" swing, 48" cc ...L26
25" swing, 72" cc ...L26
25" swing, 96" cc ...L26
25" swing, 120" cc ...L26
25" swing, 144" cc ...L26
25" swing, 168" cc ...L26
25" swing, 192" cc ...L26
25" swing, 216" cc ...L26
25" swing, 240" cc ...L26
25" swing, 264" cc ...L26
25" swing, 288" cc ...L26
32" swing, 48" cc ...L26
32" swing, 72" cc ...L26
32" swing, 96" cc ...L26
32" swing, 120" cc ...L26
32" swing, 144" cc ...L26
32" swing, 168" cc ...L26
32" swing, 192" cc ...L26
32" swing, 216" cc ...L26
32" swing, 240" cc ...L26
32" swing, 264" cc ...L26
32" swing, 288" cc ...L26
36" swing, 4' cc, Medium Duty ...S24
36" swing, 6' cc, Medium Duty ...S24
36" swing, 8' cc, Medium Duty ...S24
36" swing, 10' cc, Medium Duty ...S24
36" swing, 12' cc, Medium Duty ...S24
36" swing, 14' cc, Medium Duty ...S24
36" swing, 16' cc, Medium Duty ...S24
36" swing, 18' cc, Medium Duty ...S24
36" swing, 20' cc, Medium Duty ...S24
36" swing, 22' cc, Medium Duty ...S24
36" swing, 24' cc, Medium Duty ...S24
36" swing, 26' cc, Medium Duty ...S24
36" swing, 28' cc, Medium Duty ...S24
36" swing, 30' cc, Medium Duty ...S24
36" swing, 32' cc, Medium Duty ...S24
36" swing, 34' cc, Medium Duty ...S24
36" swing, 36' cc, Medium Duty ...S24
36" swing, 38' cc, Medium Duty ...S24
36" swing, 40' cc, Medium Duty ...S24
36" swing, 42' cc, Medium Duty ...S24
36" swing, 44' cc, Medium Duty ...S24
36" swing, 46' cc, Medium Duty ...S24

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Light Duty Floor Lathes

Engine

(Continued)

36" swing, 48' cc, Medium Duty S24
36" swing, 50' cc, Medium Duty S24
36" swing, 52' cc, Medium Duty S24
36" swing, 54' cc, Medium Duty S24
36" swing, 56' cc, Medium Duty S24
36" swing, 58' cc, Medium Duty S24
36" swing, 60' cc, Medium Duty S24
36" swing, 62' cc, Medium Duty S24
36" swing, 64' cc, Medium Duty S24
36" swing, 66' cc, Medium Duty S24
36" swing, 68' cc, Medium Duty S24
36" swing, 70' cc, Medium Duty S24
36" swing, 72' cc, Medium Duty S24
36" swing, 74' cc, Medium Duty S24
36" swing, 76' cc, Medium Duty S24
36" swing, 78' cc, Medium Duty S24
36" swing, 80' cc, Medium Duty S24
36" swing, 82' cc, Medium Duty S24
36" swing, 84' cc, Medium Duty S24
36" swing, 86' cc, Medium Duty S24
36" swing, 88' cc, Medium Duty S24
36" swing, 90' cc, Medium Duty S24
36" swing, 92' cc, Medium Duty S24

Toolroom

8½" swing, 18" cc R11
9" swing, 16" to 28" cc S25
9" swing, 24" cc H15
10" swing, 14¾" to 28¾" cc S25
10" swing, 20" cc M32
10" swing, 24" cc C11
10" swing, 30" cc C11
10" swing, 36" cc C11
12" swing, 30" cc H15
12" swing, 42" cc H15
12" swing, 54" cc H15
12½" swing, 18" cc C11
12½" swing, 24" cc C11
12½" swing, 30" cc C11
12½" swing, 36" cc C11
12½" swing, 42" cc C11
12½" swing, 48" cc C11
12½" swing, 60" cc C11
13" swing, 28¼" to 52¼" cc S25
13" swing, 30" cc M32
13" swing, 54" cc M32
13" swing, 78" cc M32
13" swing, 102" cc M32
13" swing, 126" cc M32
14" swing, 30" cc A17
14" swing, 30" cc, Precision A17
14" swing, 54" cc, Precision A17
14" swing, 78" cc, Precision A17
14½" swing, 24¾" to 60⅝" cc S25
14½" swing, 30" cc P17
14½" swing, 54" cc P17
15" swing, 24" cc C11
15" swing, 30" cc C11
15" swing, 36" cc C11
15" swing, 42" cc C11
15" swing, 48" cc C11
15" swing, 54" cc C11
15" swing, 60" cc C11
15" swing, 72" cc C11
15" swing, 84" cc C11
15" swing, 96" cc C11
15" swing, 102" cc C11
15" swing, 108" cc C11
15" swing, 114" cc C11
16" swing, 30" cc A17
16" swing, 30" cc, Precision A17
16" swing, 30" cc A26
16" swing, 30" cc M32
16" swing, 33¾" to 57¼" cc S25
16" swing, 54" cc, Precision A17
16" swing, 54" cc A26
16" swing, 54" cc M32
16" swing, 78" cc, Precision A17
16" swing, 78" cc A26
16" swing, 78" cc M32
16" swing, 102" cc M32
16" swing, 126" cc M32
16" swing, 150" cc M32
16" swing, 174" cc M32
18" swing, 24" cc C11
18" swing, 30" cc C11
18" swing, 42" cc C11
18" swing, 54" cc C11
18" swing, 60" cc C11
18" swing, 72" cc C11
18" swing, 84" cc C11
18" swing, 96" cc C11
18" swing, 102" cc C11
18" swing, 108" cc C11
18" swing, 114" cc C11
18½" swing, 30" cc P17
18½" swing, 54" cc P17
18½" swing, 78" cc P17
20" swing, 30" cc L26
20" swing, 48" cc, Medium Duty A17
20" swing, 48" cc, Precision A17
20" swing, 48" cc A26
20" swing, 48" cc M32
20" swing, 54" cc L26
20" swing, 72" cc, Precision A17
20" swing, 72" cc A26
20" swing, 72" cc M32
20" swing, 78" cc L26
20" swing, 96" cc, Precision A17
20" swing, 96" cc M32
20" swing, 102" cc L26
20" swing, 120" cc M32
20" swing, 126" cc L26
20" swing, 144" cc M32
20" swing, 168" cc M32
20" swing, 192" cc M32
20" swing, 216" cc M32
25" swing, 48" cc L26
25" swing, 72" cc L26
25" swing, 96" cc L26
25" swing, 120" cc L26
25" swing, 144" cc L26
25" swing, 168" cc L26

Heavy Duty Engine Lathes

Standard

12" swing, 30" cc L10
12" swing, 54" cc L10
12" swing, 78" cc L10
12" swing, 102" cc L10
12" swing, 126" cc L10
12" swing, 150" cc L10
12" swing, 174" cc L10
12" swing, 198" cc L10
12" swing, 222" cc L10
14" swing, 30" cc A17
14" swing, 30" cc B35
14" swing, 30" cc L10
14" swing, 30" cc L26
14" swing, 30" cc, Tracer Controlled L26
14" swing, 30" cc R3
14" swing, 30" cc S13
14" to 32" swing S28
14" swing, 42" cc S13
14" swing, 54" cc B35
14" swing, 54" cc L10
14" swing, 54" cc L26
14" swing, 54" cc, Tracer Controlled L26
14" swing, 54" cc R3
14" swing, 54" cc S13
14" swing, 66" cc S13
14" swing, 78" cc B35
14" swing, 78" cc L10
14" swing, 78" cc L26
14" swing, 78" cc, Tracer Controlled L26
14" swing, 78" cc R3
14" swing, 78" cc S13
14" swing, 90" cc S13
14" swing, 102" cc B35
14" swing, 102" cc L10
14" swing, 102" cc L26
14" swing, 102" cc, Tracer Controlled L26
14" swing, 102" cc R3
14" swing, 102" cc S13
14" swing, 114" cc S13
14" swing, 126" cc B35
14" swing, 126" cc L10
14" swing, 126" cc L26
14" swing, 126" cc, Tracer Controlled L26
14" swing, 126" cc R3
14" swing, 126" cc S13
14" swing, 150" cc B35
14" swing, 150" cc L10
14" swing, 150" cc L26
14" swing, 150" cc S13
14" swing, 174" cc L10
14" swing, 174" cc L26
14" swing, 174" cc S13
14" swing, 198" cc L10
14" swing, 198" cc S13
14" swing, 222" cc L10
16" swing, 11" cc W16
16" swing, 23" cc W16
16" swing, 30" cc A17
16" swing, 30" cc A26
16" swing, 30" cc B35
16" swing, 30" cc C11
16" swing, 30" cc L10
16" swing, 30" cc L15
16" swing, 30" cc L26
16" swing, 30" cc, Tracer Controlled L26
16" swing, 30" cc or additional length in 2" increments N6
16" swing, 30" cc R3
16" swing, 30" cc S13
16" swing, 35" cc W16
16" swing, 42" cc S13
16" swing, 54" cc A26
16" swing, 54" cc B35
16" swing, 54" cc C11
16" swing, 54" cc L10
16" swing, 54" cc L15
16" swing, 54" cc L26
16" swing, 54" cc, Tracer Controlled L26
16" swing, 54" cc R3
16" swing, 54" cc S13
16" swing, 59" cc W16
16" swing, 66" cc S13
16" swing, 78" cc A26
16" swing, 78" cc B35
16" swing, 78" cc C11
16" swing, 78" cc L10
16" swing, 78" cc L15
16" swing, 78" cc L26
16" swing, 78" cc, Tracer Controlled L26
16" swing, 78" cc R3
16" swing, 78" cc S13
16" swing, 83" cc W16
16" swing, 90" cc S13
16" swing, 102" cc A26
16" swing, 102" cc B35
16" swing, 102" cc C11
16" swing, 102" cc L10
16" swing, 102" cc L15
16" swing, 102" cc L26
16" swing, 102" cc, Tracer Controlled L26
16" swing, 102" cc R3
16" swing, 102" cc S13
16" swing, 104" cc W16
16" swing, 111" cc S13
16" swing, 126" cc A26
16" swing, 126" cc B35
16" swing, 126" cc C11
16" swing, 126" cc L10
16" swing, 126" cc L15
16" swing, 126" cc L26
16" swing, 126" cc, Tracer Controlled L26
16" swing, 126" cc R3
16" swing, 126" cc S13
16" swing, 131" cc W16
16" swing, 150" cc A26
16" swing, 150" cc B35
16" swing, 150" cc C11
16" swing, 150" cc L10
16" swing, 150" cc L15
16" swing, 150" cc L26
16" swing, 150" cc S13
16" swing, 155" cc W16
16" swing, 174" cc A26
16" swing, 174" cc B35
16" swing, 174" cc C11
16" swing, 174" cc L10
16" swing, 174" cc L15
16" swing, 174" cc L26
16" swing, 174" cc S13
16" swing, 198" cc A26
16" swing, 198" cc B35
16" swing, 198" cc L10
16" swing, 198" cc S13
16" swing, 222" cc L10
16" swing, 246" cc L10
18" swing, 30" cc L15
18" swing, 32" cc W16
18" swing, 48" cc C11
18" swing, 54" cc L15
18" swing, 56" cc W16
18" swing, 72" cc C11
18" swing, 78" cc L15
18" swing, 80" cc W16
18" swing, 96" cc C11
18" swing, 102" cc L15
18" swing, 104" cc W16
18" swing, 120" cc C11
18" swing, 126" cc L15
18" swing, 128" cc W16
18" swing, 144" cc C11
18" swing, 150" cc L15
18" swing, 152" cc W16
18" swing, 168" cc C11
18" swing, 174" cc L15
18¼" swing, 48" to 144" cc M12
20" swing, 24" cc or additional length in 2" increments N6
20" swing, 28" cc W16
20" swing, 30" cc, Tracer Controlled L26
20" swing, 36" cc S13
20" swing, 48" cc A17
20" swing, 48" cc A26
20" swing, 48" cc B35
20" swing, 48" cc C11
20" swing, 48" cc L10
20" swing, 48" cc L15
20" swing, 48" cc L26
20" swing, 48" cc, Tracer Controlled L26
20" swing, 48" cc M32
20" swing, 48" cc S13
20" swing, 52" cc S15
20" swing, 52" cc W16
20" swing, 54" cc, Tracer Controlled L26
20" swing, 54" cc R3
20" swing, 60" cc S13
20" swing, 72" cc A26
20" swing, 72" cc B35
20" swing, 72" cc C11
20" swing, 72" cc L10
20" swing, 72" cc L15
20" swing, 72" cc L26
20" swing, 72" cc, Tracer Controlled L26
20" swing, 72" cc M32
20" swing, 72" cc S13
20" swing, 76" cc S15
20" swing, 76" cc W16
20" swing, 78" cc, Tracer Controlled L26
20" swing, 78" cc R3
20" swing, 84" cc S13
20" swing, 96" cc A26
20" swing, 96" cc B35
20" swing, 96" cc C11
20" swing, 96" cc L10
20" swing, 96" cc L15
20" swing, 96" cc L26
20" swing, 96" cc, Tracer Controlled L26

LATHES

(The number following each listing indicates manufacturer, key on page 82)

Heavy Duty Engine Lathes

Standard

(Continued)

20" swing, 96" cc M32
20" swing, 96" cc S13
20" swing, 100" cc S15
20" swing, 100" cc W16
20" swing, 102" cc K3
Tracer Controlled L26
20" swing, 102" cc K3
20" swing, 108" cc S13
20" swing, 120" cc A26
20" swing, 120" cc B35
20" swing, 120" cc C11
20" swing, 120" cc L10
20" swing, 120" cc L15
20" swing, 120" cc L26
20" swing, 120" cc K3
Tracer Controlled L26
20" swing, 120" cc M32
20" swing, 120" cc S13
20" swing, 123" cc S15
20" swing, 124" cc W16
20" swing, 126" cc K3
Tracer Controlled L26
20" swing, 126" cc K3
20" swing, 132" cc S13
20" swing, 144" cc A26
20" swing, 144" cc B35
20" swing, 144" cc C11
20" swing, 144" cc L10
20" swing, 144" cc L15
20" swing, 144" cc L26
20" swing, 144" cc M32
20" swing, 144" cc S13
20" swing, 148" cc S15
20" swing, 148" cc W16
20" swing, 156" cc K3
20" swing, 160" cc A26
20" swing, 168" cc B35
20" swing, 168" cc C11
20" swing, 168" cc L10
20" swing, 168" cc L15
20" swing, 168" cc L26
20" swing, 168" cc M32
20" swing, 168" cc S13
20" swing, 172" cc S15
20" swing, 192" cc A26
20" swing, 192" cc B35
20" swing, 192" cc L10
20" swing, 192" cc L26
20" swing, 192" cc M32
20" swing, 192" cc S13
20" swing, 216" cc A26
20" swing, 216" cc B35
20" swing, 216" cc L10
20" swing, 216" cc L26
20" swing, 216" cc M32
20" swing, 226" cc S13
20" swing, 240" cc A26
20" swing, 240" cc B35
20" swing, 240" cc L10
20" swing, 240" cc L26
20" swing, 240" cc M32
20" swing, 264" cc A26
20" swing, 264" cc B35
20" swing, 264" cc L10
20" swing, 264" cc L26
20" swing, 288" cc A26
20" swing, 288" cc L26
20" swing, 312" cc A26
20¼" swing, 48" to 144" cc M32
22" swing, 48" cc L15
22" swing, 72" cc L15
22" swing, 96" cc L15
22" swing, 120" cc L15
22" swing, 144" cc L15
22" swing, 168" cc L15
22" swing, 192" cc L15
22" swing, 216" cc L15
22" swing, 240" cc L15
22" swing, 264" cc L15
22" swing, 288" cc L15
22¼" swing, 48" to 144" cc M32
22¼" swing, 48" to 144" cc M32
24" swing, 30" cc W16
24" swing, 48" cc C11
24" swing, 51" cc W16
24" swing, 72" cc C11
24" swing, 78" cc W16
24" swing, 96" cc C11
24" swing, 102" cc W16
24" swing, 120" cc C11
24" swing, 126" cc W16
24" swing, 144" cc C11
24" swing, 150" cc W16
24" swing, 168" cc C11
24" swing, 192" cc C11
24" swing, 216" cc C11
24" swing, 240" cc C11
24" swing, 264" cc C11
25" swing, 48" cc A17
26" swing, 48" cc A26
26" swing, 54" cc B35
26" swing, 54" cc L10
26" swing, 54" cc L15
26" swing, 108" cc L15
26" swing, 162" cc L15
26" swing, 216" cc L15
26" swing, 270" cc L15
26" swing, 324" cc L15
26" swing,

LATHES

(Code number following each listing indicates manufacturer, key on page 821)

Heavy Duty Engine Lathes

Standard

(Continued)

32" swing, 34' cc S24
32" swing, 34' cc W19
32" swing, 35' cc L10
32" swing, 36' cc S24
32" swing, 36' cc W19
32" swing, 37' cc L10
32" swing, 38' cc S24
32" swing, 38' cc W19
32" swing, 40' cc S24
32" swing, 40' cc W19
32" swing, 42' cc S24
32" swing, 42' cc W19
32" swing, 44' cc S24
32" swing, 44' cc W19
32" swing, 46' cc S24
32" swing, 46' cc W19
32" swing, 48' cc S24
32" swing, 48' cc W19
32" swing, 50' cc S24
32" swing, 50' cc W19
32" swing, 52' cc S24
32" swing, 52' cc W19
32" swing, 54' cc S24
32" swing, 54' cc W19
32" swing, 56' cc S24
32" swing, 56' cc W19
32" swing, 58' cc S24
32" swing, 58' cc W19
32" swing, 60' cc S24
32" swing, 60' cc W19
32" swing, 62' cc S24
32" swing, 62' cc S24
32" swing, 64' cc S24
32" swing, 66' cc S24
32" swing, 68' cc S24
32" swing, 70' cc S24
32" swing, 72' cc S24
32" swing, 74' cc S24
32" swing, 76' cc S24
32" swing, 78' cc S24
32" swing, 80' cc S24
32" swing, 82' cc S24
32" swing, 84' cc S24
32" swing, 86' cc S24
32" swing, 88' cc S24
32" swing, 90' cc S24
32" swing, 100' cc S24
36" swing, 4' cc S24
for add'l length
or 2" increments ..... No
36" swing, 4' cc S24
Face Plate Drive W19
36" swing, 4' cc L10
36" swing, 5' cc L10
36" swing, 6' cc S24
Face Plate Drive W19
36" swing, 6' cc L10
36" swing, 7' cc L10
36" swing, 8' cc S24
Face Plate Drive W19
36" swing, 8' cc L10
36" swing, 9' cc L10
36" swing, 10' cc S24
Face Plate Drive W19
36" swing, 10' cc L10
36" swing, 11' cc L10
36" swing, 12' cc S24
Face Plate Drive W19
36" swing, 12' cc L10
36" swing, 13' cc L10
36" swing, 14' cc S24
Face Plate Drive W19
36" swing, 14' cc L10
36" swing, 15' cc L10
36" swing, 16' cc S24
Face Plate Drive W19
36" swing, 16' cc L10
36" swing, 17' cc L10
36" swing, 18' cc S24
Face Plate Drive W19
36" swing, 18' cc L10
36" swing, 19' cc L10
36" swing, 20' cc S24
Face Plate Drive W19
36" swing, 20' cc L10
36" swing, 21' cc L10
36" swing, 22' cc S24
Face Plate Drive W19
36" swing, 22' cc L10
36" swing, 23' cc L10
36" swing, 24' cc S24
Face Plate Drive W19
36" swing, 24' cc L10
36" swing, 25' cc L10
36" swing, 26' cc S24
Face Plate Drive W19
36" swing, 26' cc L10
36" swing, 27' cc L10
36" swing, 28' cc S24
Face Plate Drive S24
36" swing, 28' cc W19
36" swing, 30' cc S24
Face Plate Drive S24
36" swing, 30' cc W19
36" swing, 32' cc S24
Face Plate Drive S24
36" swing, 32' cc W19
36" swing, 34' cc S24
Face Plate Drive S24
36" swing, 34' cc W19
36" swing, 36' cc S24
Face Plate Drive S24
36" swing, 36' cc W19
36" swing, 38' cc S24
Face Plate Drive S24
36" swing, 38' cc W19
36" swing, 40' cc S24
Face Plate Drive S24
36" swing, 40' cc W19
36" swing, 42' cc S24
Face Plate Drive S24
36" swing, 42' cc W19
36" swing, 44' cc S24
Face Plate Drive S24
36" swing, 44' cc W19
36" swing, 46' cc S24
Face Plate Drive S24
36" swing, 46' cc W19
36" swing, 48' cc S24
Face Plate Drive S24
36" swing, 48' cc W19
36" swing, 50' cc S24
Face Plate Drive S24
36" swing, 50' cc W19
36" swing, 52' cc S24
Face Plate Drive S24
36" swing, 52' cc W19
36" swing, 54' cc S24
Face Plate Drive S24
36" swing, 54' cc W19
36" swing, 56' cc S24
Face Plate Drive S24
36" swing, 56' cc W19
36" swing, 58' cc S24
Face Plate Drive S24
36" swing, 58' cc W19
36" swing, 60' cc S24
Face Plate Drive S24
36" swing, 60' cc W19
36" swing, 62' cc S24
Face Plate Drive S24
36" swing, 62' cc W19
36" swing, 64' cc S24
Face Plate Drive S24
36" swing, 64' cc W19
36" swing, 66' cc S24
Face Plate Drive S24
36" swing, 66' cc W19
36" swing, 68' cc S24
Face Plate Drive S24
36" swing, 68' cc W19
36" swing, 70' cc S24
Face Plate Drive S24
36" swing, 70' cc W19
36" swing, 72' cc S24
Face Plate Drive S24
36" swing, 72' cc W19
36" swing, 74' cc S24
Face Plate Drive S24
36" swing, 74' cc W19
36" swing, 76' cc S24
Face Plate Drive S24
36" swing, 76' cc W19
36" swing, 78' cc S24
Face Plate Drive S24
36" swing, 78' cc W19
36" swing, 80' cc S24
Face Plate Drive S24
36" swing, 80' cc W19
36" swing, 82' cc S24
Face Plate Drive S24
36" swing, 82' cc W19
36" swing, 84' cc S24
Face Plate Drive S24
36" swing, 84' cc W19
36" swing, 86' cc S24
Face Plate Drive S24
36" swing, 86' cc W19
36" swing, 88' cc S24
Face Plate Drive S24
36" swing, 88' cc W19
36" swing, 90' cc S24
Face Plate Drive S24
36" swing, 90' cc W19
36" swing, 92' cc S24
Face Plate Drive S24
36" swing, 92' cc W19
36" swing, 94' cc S24
Face Plate Drive S24
36" swing, 94' cc W19
36" swing, 96' cc S24
Face Plate Drive S24
36" swing, 96' cc W19
36" swing, 98' cc S24
Face Plate Drive S24
36" swing, 98' cc W19
36" swing, 100' cc S24
Face Plate Drive S24
36" swing, 100' cc W19
40" swing, 4' cc L10
40" swing, 5' cc L10
40" swing, 6' cc L10
40" swing, 7' cc L10
40" swing, 8' cc L10
40" swing, 9' cc L10
40" swing, 10' cc L10
40" swing, 11' cc L10
40" swing, 12' cc L10
40" swing, 13' cc L10
40" swing, 14' cc L10
40" swing, 15' cc L10
40" swing, 16' cc L10
40" swing, 17' cc L10
40" swing, 18' cc L10
40" swing, 19' cc L10
40" swing, 20' cc L10
40" swing, 21' cc L10
40" swing, 22' cc L10
40" swing, 23' cc L10
40" swing, 24' cc L10
40" swing, 25' cc L10
40" swing, 26' cc L10
40" swing, 27' cc L10
40" swing, 28' cc L10
40" swing, 29' cc L10
40" swing, 30' cc L10
40" swing, 31' cc L10
40" swing, 32' cc L10
40" swing, 33' cc L10
40" swing, 34' cc L10
40" swing, 35' cc L10
40" swing, 36' cc L10
40" swing, 37' cc L10
40" swing, 38' cc L10
40" swing, 39' cc L10
40" swing, 40' cc L10
40" swing, 41' cc L10
40" swing, 42' cc L10
40" swing, 43' cc L10
40" swing, cc special B4
42" swing, and up C36
42" swing, 4' cc,
Face Plate Drive S24
42" swing, 5' cc W19
42" swing, 6' cc,
Face Plate Drive S24
42" swing, 7' cc W19
42" swing, 8' cc,
Face Plate Drive S24
42" swing, 9' cc W19
42" swing, 10' cc,
Face Plate Drive S24
42" swing, 11' cc W19
42" swing, 12' cc,
Face Plate Drive S24
42" swing, 13' cc W19
42" swing, 14' cc,
Face Plate Drive S24
42" swing, 15' cc W19
42" swing, 16' cc,
Face Plate Drive S24
42" swing, 17' cc W19
42" swing, 18' cc,
Face Plate Drive S24
42" swing, 19' cc W19
42" swing, 20' cc,
Face Plate Drive S24
42" swing, 21' cc W19
42" swing, 22' cc,
Face Plate Drive S24
42" swing, 23' cc W19
42" swing, 24' cc,
Face Plate Drive S24
42" swing, 25' cc W19
42" swing, 26' cc,
Face Plate Drive S24
42" swing, 27' cc W19
42" swing, 28' cc,
Face Plate Drive S24
42" swing, 29' cc W19
42" swing, 30' cc,
Face Plate Drive S24
42" swing, 31' cc W19
42" swing, 32' cc,
Face Plate Drive S24
42" swing, 33' cc W19
42" swing, 34' cc,
Face Plate Drive S24
42" swing, 35' cc W19
42" swing, 36' cc,
Face Plate Drive S24
42" swing, 37' cc W19
42" swing, 38' cc,
Face Plate Drive S24
42" swing, 39' cc W19
42" swing, 40' cc,
Face Plate Drive S24
42" swing, 41' cc W19
42" swing, 42' cc,
Face Plate Drive S24
42" swing, 43' cc W19
42" swing, 44' cc,
Face Plate Drive S24
42" swing, 45' cc W19
42" swing, 46' cc,
Face Plate Drive S24
42" swing, 47' cc W19
42" swing, 48' cc,
Face Plate Drive S24
42" swing, 49' cc W19
42" swing, 50' cc,
Face Plate Drive S24
42" swing, 51' cc W19
42" swing, 52' cc,
Face Plate Drive S24
42" swing, 53' cc W19
42" swing, 54' cc,
Face Plate Drive S24
42" swing, 55' cc W19
42" swing, 56' cc,
Face Plate Drive S24
42" swing, 57' cc W19
42" swing, 58' cc,
Face Plate Drive S24
42" swing, 59' cc W19
42" swing, 60' cc,
Face Plate Drive S24
42" swing, 61' cc W19
42" swing, 62' cc,
Face Plate Drive S24
42" swing, 63' cc W19
42" swing, 64' cc,
Face Plate Drive S24
42" swing, 65' cc W19
42" swing, 66' cc,
Face Plate Drive S24
42" swing, 67' cc W19
42" swing, 68' cc,
Face Plate Drive S24
42" swing, 69' cc W19
42" swing, 70' cc,
Face Plate Drive S24
42" swing, 71' cc W19
42" swing, 72' cc,
Face Plate Drive S24
42" swing, 73' cc W19
42" swing, 74' cc,
Face Plate Drive S24
42" swing, 75' cc,
Face Plate Drive S24
42" swing, 76' cc,
Face Plate Drive S24
42" swing, 78' cc,
Face Plate Drive S24
42" swing, 80' cc,
Face Plate Drive S24
42" swing, 82' cc,
Face Plate Drive S24
42" swing, 84' cc,
Face Plate Drive S24
42" swing, 86' cc,
Face Plate Drive S24
42" swing, 88' cc,
Face Plate Drive S24
42" swing, 90' cc,
Face Plate Drive S24
48" swing, 5' cc W19
48" swing, 7' cc W19
48" swing, 9' cc W19
48" swing, 10' cc S15
48" swing, 11' cc W19
48" swing, 13' cc W19
48" swing, 14' cc S15
48" swing, 15' cc M1
48" swing, 15' cc W19
48" swing, 17' cc W19
48" swing, 19' cc W19
48" swing, 20' cc M1
48" swing, 20' cc S15
48" swing, 21' cc W19
48" swing, 23' cc W19
48" swing, 24' cc S15
48" swing, 25' cc M1
48" swing, 25' cc W19
48" swing, 27' cc W19
48" swing, 29' cc M1
48" swing, 30' cc S15
48" swing, 30' cc W19
48" swing, 31' cc W19
48" swing, 33' cc S15
48" swing, 33' cc M1
48" swing, 35' cc W19
48" swing, 37' cc W19
48" swing, 39' cc M1
48" swing, 40' cc S15
48" swing, 41' cc W19
48" swing, 43' cc W19
48" swing, 44' cc S15
48" swing, 45' cc M1
48" swing, 47' cc W19
48" swing, 49' cc W19
48" swing, 50' cc M1
48" swing, 51' cc S15
48" swing, 53' cc W19
48" swing, 55' cc M1
48" swing, 56' cc S15
48" swing, 57' cc W19
48" swing, 59' cc W19
48" swing, 60' cc M1
48" swing, 61' cc S15
48" swing, 63' cc W19
48" swing, 65' cc M1
48" swing, 66' cc S15
48" swing, 67' cc W19
48" swing, 69' cc W19
48" swing, 70' cc M1
48" swing, 71' cc S15
48" swing, 73' cc W19
48" swing, 75' cc M1
48" swing, 76' cc S15
48" swing, 77' cc W19
48" swing, 79' cc W19
48" swing, 80' cc M1
48" swing, 81' cc S15
48" swing, 83' cc W19
48" swing, 85' cc M1
48" swing, 86' cc S15
48" swing, 87' cc W19
48" swing, 89' cc W19
48" swing, 90' cc M1
48" to 120" swing M18
50" swing, 5' cc L10
50" swing, 6' cc,
Face Plate Drive S24
50" swing, 7' cc L10
50" swing, 8' cc,
Face Plate Drive S24
50" swing, 9' cc L10
50" swing, 10' cc,
Face Plate Drive S24
50" swing, 11' cc L10
50" swing, 12' cc,
Face Plate Drive S24
50" swing, 13' cc L10
50" swing, 14' cc,
Face Plate Drive S24
50" swing, 15' cc L10

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Heavy Duty Engine Lathes

Standard

(Continued)

50" swing, 16' cc
Face Plate Drive S24
50" swing, 17' cc L10
50" swing, 18' cc,
Face Plate Drive S24
50" swing, 19' cc L10
50" swing, 20' cc,
Face Plate Drive S24
50" swing, 21' cc L10
50" swing, 22' cc,
Face Plate Drive S24
50" swing, 23' cc L10
50" swing, 24' cc,
Face Plate Drive S24
50" swing, 25' cc L10
50" swing, 26' cc,
Face Plate Drive S24
50" swing, 27' cc L10
50" swing, 28' cc,
Face Plate Drive S24
50" swing, 29' cc L10
50" swing, 30' cc,
Face Plate Drive S24
50" swing, 31' cc L10
50" swing, 32' cc,
Face Plate Drive S24
50" swing, 33' cc L10
50" swing, 34' cc,
Face Plate Drive S24
50" swing, 35' cc L10
50" swing, 36' cc,
Face Plate Drive S24
50" swing, 37' cc L10
50" swing, 38' cc,
Face Plate Drive S24
50" swing, 39' cc L10
50" swing, 40' cc,
Face Plate Drive S24
50" swing, 41' cc L10
50" swing, 42' cc,
Face Plate Drive S24
50" swing, 43' cc L10
50" swing, 44' cc,
Face Plate Drive S24
50" swing, 46' cc,
Face Plate Drive S24
50" swing, 47' cc L10
50" swing, 48' cc,
Face Plate Drive S24
50" swing, 49' cc L10
50" swing, 50' cc,
Face Plate Drive S24
50" swing, 51' cc L10
50" swing, 52' cc,
Face Plate Drive S24
50" swing, 53' cc L10
50" swing, 54' cc,
Face Plate Drive S24
50" swing, 55' cc L10
50" swing, 56' cc,
Face Plate Drive S24
50" swing, 57' cc L10
50" swing, 58' cc,
Face Plate Drive S24
50" swing, 59' cc L10
50" swing, 60' cc,
Face Plate Drive S24
50" swing, 62' cc,
Face Plate Drive S24
50" swing, 64' cc,
Face Plate Drive S24
50" swing, 66' cc,
Face Plate Drive S24
50" swing, 68' cc,
Face Plate Drive S24
50" swing, 70' cc,
Face Plate Drive S24
50" swing, 72' cc,
Face Plate Drive S24
50" swing, 74' cc,
Face Plate Drive S24
50" swing, 76' cc,
Face Plate Drive S24
50" swing, 78' cc,
Face Plate Drive S24
50" swing, 80' cc,
Face Plate Drive S24
50" swing, 82' cc,
Face Plate Drive S24
50" swing, 84' cc,
Face Plate Drive S24
50" swing, 88' cc,
Face Plate Drive S24
50" swing, cc special B4
51" swing, 10' cc S15
51" swing, 14' cc S15
51" swing, 20' cc S15
51" swing, 24' cc S15
51" swing, 30' cc S15
51" swing, 34' cc S15
51" swing, 40' cc S15
51" swing, 44' cc S15
54" swing, 50' cc S15
54" swing, 54' cc S15
54" swing, 60' cc S15
60" swing, 6' cc,
Face Plate Drive S24
60" swing, 8' cc,
Face Plate Drive S24
60" swing, 8' cc W19
60" swing, 10' cc,
Face Plate Drive S24
60" swing, 10' cc W19
60" swing, 12' cc,
Face Plate Drive S24
60" swing, 12' cc W19
60" swing, 14' cc,
Face Plate Drive S24
60" swing, 14' cc W19
60" swing, 15' cc M1
60" swing, 16' cc,
Face Plate Drive S24
60" swing, 16' cc W19
60" swing, 18' cc,
Face Plate Drive S24
60" swing, 18' cc W19
60" swing, 20' cc,
Face Plate Drive S24
60" swing, 20' cc W19
60" swing, 20' cc M1
60" swing, 20' cc,
Face Plate Drive S24
60" swing, 20' cc W19
60" swing, 22' cc,
Face Plate Drive S24
60" swing, 22' cc W19
60" swing, 24' cc,
Face Plate Drive S24
60" swing, 24' cc W19
60" swing, 25' cc M1
60" swing, 26' cc,
Face Plate Drive S24
60" swing, 26' cc W19
60" swing, 28' cc,
Face Plate Drive S24
60" swing, 28' cc W19
60" swing, 30' cc M1
60" swing, 30' cc,
Face Plate Drive S24
60" swing, 30' cc W19
60" swing, 32' cc,
Face Plate Drive S24
60" swing, 32' cc W19
60" swing, 34' cc,
Face Plate Drive S24
60" swing, 34' cc W19
60" swing, 35' cc M1
60" swing, 36' cc,
Face Plate Drive S24
60" swing, 36' cc W19
60" swing, 38' cc,
Face Plate Drive S24
60" swing, 38' cc W19
60" swing, 40' cc M1
60" swing, 40' cc,
Face Plate Drive S24
60" swing, 40' cc W19
60" swing, 42' cc,
Face Plate Drive S24
60" swing, 42' cc W19
60" swing, 44' cc,
Face Plate Drive S24
60" swing, 44' cc W19
60" swing, 45' cc M1
60" swing, 46' cc,
Face Plate Drive S24
60" swing, 46' cc W19
60" swing, 48' cc,
Face Plate Drive S24
60" swing, 48' cc W19
60" swing, 50' cc M1
60" swing, 50' cc,
Face Plate Drive S24
60" swing, 50' cc W19
60" swing, 52' cc,
Face Plate Drive S24
60" swing, 52' cc W19
60" swing, 54' cc,
Face Plate Drive S24
60" swing, 54' cc W19
60" swing, 55' cc M1
60" swing, 56' cc,
Face Plate Drive S24
60" swing, 56' cc W19
60" swing, 58' cc,
Face Plate Drive S24
60" swing, 58' cc W19
60" swing, 60' cc M1
60" swing, 60' cc,
Face Plate Drive S24
60" swing, 62' cc,
Face Plate Drive S24
60" swing, 64' cc,
Face Plate Drive S24
60" swing, 64' cc W19
60" swing, 65' cc M1
60" swing, 66' cc,
Face Plate Drive S24
60" swing, 66' cc W19
60" swing, 68' cc,
Face Plate Drive S24
60" swing, 68' cc W19
60" swing, 70' cc M1
60" swing, 70' cc,
Face Plate Drive S24
60" swing, 70' cc W19
60" swing, 72' cc,
Face Plate Drive S24
60" swing, 72' cc W19
60" swing, 74' cc,
Face Plate Drive S24
60" swing, 74' cc W19
60" swing, 75' cc M1
60" swing, 76' cc,
Face Plate Drive S24
60" swing, 76' cc W19
60" swing, 78' cc,
Face Plate Drive S24
60" swing, 78' cc W19
60" swing, 80' cc M1
60" swing, 80' cc,
Face Plate Drive S24
60" swing, 80' cc W19
60" swing, 82' cc,
Face Plate Drive S24
60" swing, 82' cc W19
60" swing, 84' cc,
Face Plate Drive S24
60" swing, 84' cc W19
60" swing, 85' cc M1
60" swing, 86' cc,
Face Plate Drive S24
60" swing, 86' cc W19
60" swing, 88' cc,
Face Plate Drive S24
60" swing, 88' cc W19
60" swing, 90' cc W19
60" swing, cc special B4
60" swing, cc special S15
72" swing, 15' cc M1
72" swing, 20' cc M1
72" swing, 25' cc M1
72" swing, 30' cc M1
72" swing, 35' cc M1
72" swing, 40' cc M1
72" swing, 45' cc M1
72" swing, 50' cc M1
72" swing, 55' cc M1
72" swing, 60' cc M1
72" swing, 65' cc M1
72" swing, 70' cc M1
72" swing, 75' cc M1
72" swing, 80' cc M1
72" swing, 85' cc M1
72" swing, cc special B4
84" swing, 15' cc M1
84" swing, 20' cc M1
84" swing, 25' cc M1
84" swing, 30' cc M1
84" swing, 35' cc M1
84" swing, 40' cc M1
84" swing, 45' cc M1
84" swing, 50' cc M1
84" swing, 55' cc M1
84" swing, 60' cc M1
84" swing, 65' cc M1
84" swing, 70' cc M1
84" swing, 75' cc M1
84" swing, 80' cc M1
84" swing, 85' cc M1
84" swing, cc special B4
96" (and larger) swing,
cc special B4

Toolroom

12" swing, 30" cc B36
12" swing, 30" cc H15
12" swing, 30" cc L10
12" swing, 42" cc H15
12" swing, 54" cc B36
12" swing, 54" cc H15
12" swing, 54" cc L10
12" swing, 78" cc B36
12" swing, 78" cc L10
12" swing, 102" cc B36
12" swing, 102" cc L10
12" swing, 126" cc B36
12" swing, 126" cc L10
12" swing, 150" cc L10
12" swing, 174" cc L10
12" swing, 198" cc L10
12" swing, 222" cc L10
12½" swing, 20" cc R11
14" swing, 30" cc B36
14" swing, 30" cc H15
14" swing, 30" cc L10
14" swing, 30" cc L26
14" swing, 30" cc R3
14" swing, 30" cc S13
14" swing, 42" cc H15
14" swing, 42" cc S13
14" swing, 54" cc B36
14" swing, 54" cc H15
14" swing, 54" cc L10
14" swing, 54" cc L26
14" swing, 54" cc R3
14" swing, 54" cc S13
14" swing, 66" cc H15
14" swing, 66" cc S13
14" swing, 78" cc B36
14" swing, 78" cc L10
14" swing, 78" cc L26
14" swing, 78" cc R3
14" swing, 78" cc S13
14" swing, 90" cc S13
14" swing, 102" cc B36
14" swing, 102" cc L10
14" swing, 102" cc L26
14" swing, 102" cc R3
14" swing, 102" cc S13
14" swing, 114" cc S13
14" swing, 126" cc B36
14" swing, 126" cc L10
14" swing, 126" cc L26
14" swing, 126" cc R3
14" swing, 126" cc S13
14" swing, 150" cc B36
14" swing, 150" cc L10
14" swing, 150" cc S13
14" swing, 174" cc L10
14" swing, 174" cc S13
14" swing, 198" cc L10
14" swing, 198" cc S13
14" swing, 222" cc L10
14" swing, 222" cc S13
14" to 32" swing S28
16" swing, 30" cc B36
16" swing, 30" cc L10
16" swing, 30" cc L26
16" swing, 30" cc R3
16" swing, 30" cc S13
16" swing, 42" cc H15
16" swing, 42" cc S13
16" swing, 54" cc B36
16" swing, 54" cc L10
16" swing, 54" cc H15
16" swing, 54" cc L26
16" swing, 54" cc R3
16" swing, 54" cc S13
16" swing, 66" cc H15
16" swing, 66" cc S13
16" swing, 78" cc B36
16" swing, 78" cc H15
16" swing, 78" cc L10
16" swing, 78" cc L26
16" swing, 78" cc R3
16" swing, 78" cc S13
16" swing, 90" cc H15
16" swing, 90" cc S13
16" swing, 102" cc B36
16" swing, 102" cc L10
16" swing, 102" cc L26
16" swing, 102" cc R3
16" swing, 102" cc S13
16" swing, 114" cc S13
16" swing, 126" cc B36
16" swing, 126" cc L10
16" swing, 126" cc L26
16" swing, 126" cc R3
16" swing, 126" cc S13
16" swing, 150" cc B36
16" swing, 150" cc L10
16" swing, 150" cc S13
16" swing, 174" cc L10
16" swing, 174" cc S13
16" swing, 198" cc L10
16" swing, 198" cc S13
16" swing, 222" cc L10
16" swing, 246" cc L10
18" swing, 30" cc H15
18" swing, 54" cc H15
18" swing, 78" cc H15
18" swing, 102" cc H15
20" swing, 30" cc L26
20" swing, 36" cc S13
20" swing, 48" cc A17
20" swing, 48" cc H15
20" swing, 48" cc L10
20" swing, 48" cc L26
20" swing, 48" cc S13
20" swing, 54" cc L26
20" swing, 60" cc S13
20" swing, 72" cc H15
20" swing, 72" cc L10
20" swing, 72" cc L26
20" swing, 72" cc S13
20" swing, 78" cc L26
20" swing, 84" cc S13
20" swing, 96" cc H15
20" swing, 96" cc L10
20" swing, 96" cc L26
20" swing, 96" cc S13
20" swing, 102" cc L26
20" swing, 108" cc S13
20" swing, 120" cc H15

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Heavy Duty Engine Lathes

Toolroom

(Continued)

20" swing, 120" cc L10
20" swing, 120" cc L26
20" swing, 120" cc S13
20" swing, 126" cc L26
20" swing, 132" cc S13
20" swing, 144" cc H15
20" swing, 144" cc L10
20" swing, 144" cc L26
20" swing, 144" cc S13
20" swing, 168" cc L10
20" swing, 168" cc L26
20" swing, 168" cc S13
20" swing, 192" cc L10
20" swing, 192" cc S13
20" swing, 216" cc L10
20" swing, 226" cc S13
20" swing, 240" cc L10
20" swing, 264" cc L10
24" swing, 48" cc H15
24" swing, 72" cc H15
24" swing, 96" cc H15
24" swing, 120" cc H15
24" swing, 144" cc H15
25" swing, 48" cc L26
25" swing, 72" cc L26
25" swing, 96" cc L26
25" swing, 120" cc L26
25" swing, 144" cc L26
25" swing, 168" cc L26
32" swing, 48" cc L26
32" swing, 72" cc L26
32" swing, 96" cc L26
32" swing, 120" cc L26
32" swing, 144" cc L26
32" swing, 168" cc L26
Special S28

Manufacturing & Production Multiple Tool

4" swing, 36" cc S8
4" swing, 60" cc S8
4" swing, 84" cc S8
4" swing, 108" cc S8
4" swing, 132" cc S8
7" swing, 40" cc S8
7" swing, 60" cc S8
7" swing, 80" cc S8
7" swing, 100" cc S8
8" swing, 36" cc S8
8" swing, 60" cc S8
8" swing, 84" cc S8
8" swing, 108" cc S8
8" swing, 132" cc S8
12" swing, 18" cc L23
12" swing, 20" cc L10
12" swing, 22" cc L10
12" swing, 30" cc B36
12" swing, 32" cc L10
12" swing, 44" cc L10
12" swing, 54" cc B36
12" swing, 56" cc L10
12" swing, 68" cc L10
12" swing, 78" cc B36
12" swing, 102" cc B36
12" swing, 126" cc B36
13" swing, 12" cc L10
13" swing, 18" cc L10
13" swing, 24" cc L10
13" swing, 30" cc L10
13" swing, 36" cc L10
13" swing, 42" cc L10
13" swing, 54" cc L10
13" swing, 60" cc L10
13" swing, 66" cc L10
13" swing, 72" cc L10
13" swing, 78" cc L10
13" swing, 84" cc L10
13" swing, 90" cc L10
13" swing, 96" cc L10
13" swing, 102" cc L10
14" swing, 30" cc, Multi-Production A17
14" swing, 30" cc B36
14" swing, 54" cc, Multi-Production A17
14" swing, 54" cc B36
14" swing, 60" cc S8
14" swing, 78" cc, Multi-Production A17
14" swing, 78" cc B36
14" swing, 102" cc B36
14" swing, 126" cc B36
14" swing, 150" cc B36
14" swing, 156" cc S8
14" swing, 252" cc S8
16" swing, 30" cc, Multi-Production A17
16" swing, 30" cc B36
16" swing, 34" cc L10
16" swing, 46" cc L10
16" swing, 54" cc, Multi-Production A17
16" swing, 54" cc B36
16" swing, 58" cc L10
16" swing, 70" cc L10
16" swing, 78" cc, Multi-Production A17
16" swing, 78" cc B36
16" swing, 102" cc B36
16" swing, 126" cc B36
16" swing, 150" cc B36
17" swing, 16" cc L10
17" swing, 28" cc L10
17" swing, 40" cc L10
17" swing, 52" cc L10
17" swing, 64" cc L10
17" swing, 76" cc L10
17" swing, 88" cc L10
17" swing, 100" cc L10
18" swing, 58" cc R6
20" swing, 24" cc L10
20" swing, 30" cc, Multi-Production A17
20" swing, 37" cc L10
20" swing, 46" cc L10
20" swing, 54" cc, Multi-Production A17
20" swing, 61" cc L10
20" swing, 73" cc L10
20" swing, 78" cc, Multi-Production A17
20" swing, 85" cc L10
20" swing, 97" cc L10
20" swing, 109" cc L10
20" swing, 121" cc L10
20" swing, 133" cc L10
20" swing, 145" cc L10
21" swing, 48" cc, Automatic M34
21" swing, 96" cc, Automatic M34
21" swing, 120" cc, Automatic M34
21" swing M34
27" swing, 36" cc, Automatic M34
27" swing, 48" cc, Automatic M34
27" swing, 96" cc, Automatic M34
27" swing, 120" cc, Automatic M34
30" swing M34
36" swing, 96" cc M34
36" swing, 120" cc M34
42" swing, 60" cc, Super-productive A17
42" swing, 84" cc, Super-productive A17
42" swing, 92" cc M34
42" swing, 108" cc, Super-productive A17
42" swing, 132" cc, Super-productive A17
42" swing, 144" cc M34
42" swing M34
48" swing, 60" cc, Super-productive A17
48" swing, 84" cc, Super-productive A17
48" swing, 108" cc, Super-productive A17
48" swing, 132" cc, Super-productive A17

Automatic Form Turning

12" swing, 10" long, Copying Lathe N7
7½" swing, 106" long, Copying Lathe N7
12" swing, 30" cc B36
12" swing, 54" cc B36
12" swing, 78" cc B36
12" swing, 102" cc B36
12" swing, 126" cc B36
13" swing, 18" cc M32
13" swing, 30" cc M32
13" swing, 42" cc M32
14" swing, 30" cc B36
14" swing, 54" cc B36
14" swing, 78" cc B36
14" swing, 102" cc B36
14" swing, 126" cc B36
14" swing, 150" cc B36
16" swing, 30" cc B36
16" swing, 54" cc B36
16" swing, 78" cc B36
16" swing, 102" cc B36
16" swing, 126" cc B36
16" swing, 150" cc B36
60" swing, 240" cc M1
70" swing over bed, cc, special B28
72" swing, 240" cc M1
Special S28

Raised From Standard Rated Swing

20" 30" swing, 48" cc L26
20" 30" swing, 72" cc L26
20" 30" swing, 96" cc L26
20" 30" swing, 120" cc L26
20" 30" swing, 144" cc L26
20" 30" swing, 168" cc L26
20" 30" swing, 192" cc L26
20" 30" swing, 216" cc L26
20" 30" swing, 240" cc L26
20" 30" swing, 264" cc L26
20" 30" swing, 288" cc L26
24" 30" swing, 48" cc L26
24" 30" swing, 72" cc L26
24" 30" swing, 96" cc L26
24" 30" swing, 120" cc L26
24" 30" swing, 144" cc L26
24" 30" swing, 168" cc L26
24" 30" swing, 192" cc L26
24" 30" swing, 216" cc L26
24" 30" swing, 240" cc L26
24" 30" swing, 264" cc L26
24" 30" swing, 288" cc L26

Gap Bed, Removable Block

12" 24" swing, 30" cc L10
12" 24" swing, 54" cc L10
12" 24" swing, 78" cc L10
12" 24" swing, 102" cc L10
12" 24" swing, 126" cc L10
12" 24" swing, 150" cc L10
12" 24" swing, 174" cc L10
12" 24" swing, 198" cc L10
12" 24" swing, 222" cc L10
14" 24" swing, 30" cc L26
14" 24" swing, 54" cc L26
14" 24" swing, 78" cc L26
14" 24" swing, 102" cc L26
14" 24" swing, 126" cc L26
14" 24" swing, 150" cc L26
14" 24" swing, 174" cc L26
14" 26" swing, 30" cc L10
14" 26" swing, 30" cc S13
14" 26" swing, 42" cc S13
14" 26" swing, 54" cc L10
14" 26" swing, 54" cc S13
14" 26" swing, 66" cc S13
14" 26" swing, 78" cc L10
14" 26" swing, 78" cc S13
14" 26" swing, 90" cc S13
14" 26" swing, 102" cc L10
14" 26" swing, 102" cc S13
14" 26" swing, 114" cc S13
14" 26" swing, 126" cc L10
14" 26" swing, 126" cc S13
14" 26" swing, 150" cc L10
14" 26" swing, 150" cc S13
14" 26" swing, 174" cc L10
14" 26" swing, 174" cc S13
14" 26" swing, 198" cc L10
14" 26" swing, 198" cc S13
14" 26" swing, 222" cc L10
15" 22" swing, 24" cc C11
15" 22" swing, 36" cc C11
15" 22" swing, 48" cc C11
15" 22" swing, 54" cc C11
15" 22" swing, 66" cc C11
15" 22" swing, 78" cc C11
15" 22" swing, 90" cc C11
15" 22" swing, 96" cc C11
15" 22" swing, 102" cc C11
15" 22" swing, 108" cc C11
16" 26" swing, 30" cc C11
16" 26" swing, 54" cc C11
16" 26" swing, 78" cc C11
16" 26" swing, 102" cc C11
16" 26" swing, 126" cc C11
16" 26" swing, 150" cc C11
16" 26" swing, 174" cc C11
16"/27" swing, 30" cc or additional length in 2" increments N6
16" 28" swing, 30" cc S13
16" 28" swing, 42" cc S13
16" 28" swing, 54" cc S13
16" 28" swing, 66" cc S13
16" 28" swing, 78" cc S13
16" 28" swing, 90" cc S13
16" 28" swing, 102" cc S13
16" 28" swing, 114" cc S13
16" 28" swing, 126" cc S13
16"/28" swing, 150" cc S13
16"/28" swing, 174" cc S13
16"/28" swing, 198" cc S13
16"/29" swing, 30" cc L26
16"/29" swing, 54" cc L26
16" 29" swing, 78" cc L26
16" 29" swing, 102" cc L26
16" 29" swing, 126" cc L26
16"/29" swing, 150" cc L26
16"/29" swing, 174" cc L26
16" 31" swing, 30" cc L10
16" 31" swing, 54" cc L10
16" 31" swing, 78" cc L10
16" 31" swing, 102" cc L10
16"/31" swing, 126" cc L10
16" 31" swing, 140" cc L10
16" 31" swing, 174" cc L10
16" 31" swing, 198" cc L10
16" 31" swing, 222" cc L10
16" 31" swing, 246" cc L10
17" 26" swing, 30" cc L10
17" 26" swing, 42" cc L10
17" 26" swing, 54" cc L10
17" 26" swing, 66" cc L10
17" 26" swing, 78" cc L10
17" 26" swing, 90" cc L10
17" 26" swing, 102" cc L10
17" 26" swing, 114" cc L10
17" 26" swing, 126" cc L10
17" 26" swing, 138" cc L10
17" 26" swing, 150" cc L10
17" 26" swing, 162" cc L10
17" 26" swing, 174" cc L10
18" 24" swing, 24" cc C11
18" 24" swing, 36" cc C11
18" 24" swing, 48" cc C11
18" 24" swing, 54" cc C11
18" 24" swing, 66" cc C11
18" 24" swing, 78" cc C11
18" 24" swing, 90" cc C11
18" 24" swing, 96" cc C11
18" 24" swing, 102" cc C11
18" 24" swing, 108" cc C11
18" 25" swing, 48" cc C11
18" 25" swing, 72" cc C11
18" 25" swing, 96" cc C11
18" 25" swing, 120" cc C11
18" 25" swing, 144" cc C11
18" 25" swing, 168" cc C11
19" 27" swing, 30" cc L10
19" 27" swing, 54" cc L10
19" 27" swing, 66" cc L10
19" 27" swing, 78" cc L10
19" 27" swing, 90" cc L10
19" 27" swing, 102" cc L10
19" 27" swing, 114" cc L10
19" 27" swing, 126" cc L10
19" 27" swing, 138" cc L10
19" 27" swing, 150" cc L10
19" 27" swing, 162" cc L10
19" 27" swing, 174" cc L10
20" 30" swing, 48" cc C11
20" 30" swing, 72" cc C11
20" 30" swing, 96" cc C11
20" 30" swing, 120" cc C11
20" 30" swing, 144" cc C11
20" 30" swing, 168" cc C11
20" 32" swing, 30" cc L26
20" 32" swing, 54" cc L26
20" 32" swing, 78" cc L26
20" 32" swing, 102" cc L26
20" 32" swing, 126" cc L26
20" 32" swing, 150" cc L26
20" 32" swing, 174" cc L26
20" 34" swing, 30" cc S13
20" 34" swing, 42" cc S13
20" 34" swing, 54" cc L10
20" 34" swing, 60" cc S13
20" 34" swing, 72" cc S13
20" 34" swing, 78" cc S13
20" 34" swing, 84" cc S13
20" 34" swing, 96" cc S13
20" 34" swing, 102" cc L10
20" 34" swing, 108" cc S13
20" 34" swing, 120" cc S13
20" 34" swing, 126" cc S13
20" 34" swing, 132" cc S13
20" 34" swing, 144" cc S13
20" 34" swing, 150" cc L10
20" 34" swing, 168" cc S13
20" 34" swing, 174" cc L10
20" 34" swing, 192" cc S13
20" 34" swing, 198" cc L10
20" 34" swing, 222" cc L10
20" 34" swing, 246" cc L10
20" 35" swing, 48" cc L26
20"/35" swing, 72" cc L26

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Heavy Duty Engine Lathes

Gap Bed, Removable Block

(Continued)

20"/35" swing, 96" cc ... L26
20"/35" swing, 120" cc ... L26
20"/35" swing, 144" cc ... L26
20"/35" swing, 168" cc ... L26
20"/35" swing, 192" cc ... L26
20"/35" swing, 216" cc ... L26
20"/35" swing, 240" cc ... L26
20"/35" swing, 264" cc ... L26
20"/35" swing, 288" cc ... L26
20"/36" swing, 48" cc ... L10
20"/36" swing, 72" cc ... L10
20"/36" swing, 96" cc ... L10
20"/36" swing, 120" cc ... L10
20"/36" swing, 144" cc ... L10
20"/36" swing, 168" cc ... L10
20"/36" swing, 192" cc ... L10
20"/36" swing, 216" cc ... L10
20"/36" swing, 240" cc ... L10
20"/36" swing, 264" cc ... L10
20" 40" swing, 24" cc or additional length in 2" increments ... N6
21"/31" swing, 36" cc ... L10
21"/31" swing, 48" cc ... L10
21"/31" swing, 60" cc ... L10
21"/31" swing, 72" cc ... L10
21"/31" swing, 84" cc ... L10
21"/31" swing, 96" cc ... L10
21"/31" swing, 108" cc ... L10
21"/31" swing, 120" cc ... L10
21"/31" swing, 132" cc ... L10
21"/31" swing, 144" cc ... L10
21"/31" swing, 156" cc ... L10
21"/31" swing, 168" cc ... L10
21"/31" swing, 180" cc ... L10
21"/31" swing, 192" cc ... L10
21"/31" swing, 204" cc ... L10
21"/31" swing, 216" cc ... L10
24"/41" swing, 36" cc ... L10
24"/41" swing, 48" cc ... L10
24"/41" swing, 60" cc ... L10
24"/41" swing, 72" cc ... L10
24"/41" swing, 84" cc ... L10
24"/41" swing, 96" cc ... L10
24"/41" swing, 108" cc ... L10
24"/41" swing, 120" cc ... L10
24"/41" swing, 132" cc ... L10
24"/41" swing, 144" cc ... L10
24"/41" swing, 156" cc ... L10
24"/41" swing, 168" cc ... L10
24"/41" swing, 180" cc ... L10
24"/41" swing, 192" cc ... L10
24"/41" swing, 204" cc ... L10
24"/41" swing, 216" cc ... L10
24"/48" swing, 48" cc ... C11
24"/48" swing, 72" cc ... C11
24"/48" swing, 96" cc ... C11
24"/48" swing, 120" cc ... C11
24"/48" swing, 144" cc ... C11
24"/48" swing, 168" cc ... C11
24"/48" swing, 192" cc ... C11
24"/48" swing, 240" cc ... C11
24"/48" swing, 264" cc ... C11
25" 40" swing, 48" cc ... L26
25" 40" swing, 58" cc or additional length in 2" increments ... N6
25" 40" swing, 72" cc ... L26
25" 40" swing, 96" cc ... L26
25" 40" swing, 120" cc ... L26
25" 40" swing, 144" cc ... L26
25" 40" swing, 168" cc ... L26
25" 40" swing, 192" cc ... L26
25" 40" swing, 216" cc ... L26
25" 40" swing, 240" cc ... L26
25" 40" swing, 264" cc ... L26
25" 40" swing, 288" cc ... L26
25" 41" swing, 48" cc ... L26
25" 41" swing, 72" cc ... L26
25" 41" swing, 96" cc ... L26
25" 41" swing, 120" cc ... L26
25" 41" swing, 144" cc ... L26
25" 41" swing, 168" cc ... L26
25" 41" swing, 192" cc ... L26
25" 41" swing, 216" cc ... L26
25" 41" swing, 240" cc ... L26
25" 41" swing, 264" cc ... L26
25" 41" swing, 288" cc ... L26
25" 45" swing, 48" cc ... L10
25" 45" swing, 72" cc ... L10
25" 45" swing, 96" cc ... L10
25" 45" swing, 120" cc ... L10
25" 45" swing, 144" cc ... L10
25" 45" swing, 168" cc ... L10
25" 45" swing, 192" cc ... L10
25" 45" swing, 216" cc ... L10
25" 45" swing, 240" cc ... L10
25" 45" swing, 264" cc ... L10
25" 45" swing, 288" cc ... L10
25" 45" swing, 312" cc ... L10
25" 45" swing, 336" cc ... L10
25" 45" swing, 360" cc ... L10
25" 45" swing, 384" cc ... L10
25" 45" swing, 408" cc ... L10
25" 45" swing, 432" cc ... L10
25" 45" swing, 456" cc ... L10
32" 48" swing, 48" cc ... L26
32" 48" swing, 72" cc ... L26
32" 48" swing, 96" cc ... L26
32" 48" swing, 120" cc ... L26
32" 48" swing, 144" cc ... L26
32" 48" swing, 168" cc ... L26
32" 48" swing, 192" cc ... L26
32" 48" swing, 216" cc ... L26
32" 48" swing, 240" cc ... L26
32" 48" swing, 264" cc ... L26
32" 48" swing, 288" cc ... L26
32" 52" swing, 5' cc ... L10
32" 52" swing, 7' cc ... L10
32" 52" swing, 9' cc ... L10
32" 52" swing, 11' cc ... L10
32" 52" swing, 13' cc ... L10
32" 52" swing, 15' cc ... L10
32" 52" swing, 17' cc ... L10
32" 52" swing, 19' cc ... L10
32" 52" swing, 21' cc ... L10
32" 52" swing, 23' cc ... L10
32" 52" swing, 25' cc ... L10
32" 52" swing, 27' cc ... L10
32" 52" swing, 29' cc ... L10
32" 52" swing, 31' cc ... L10
32" 52" swing, 33' cc ... L10
32" 52" swing, 35' cc ... L10
32" 52" swing, 37' cc ... L10

Gap Bed, Sliding Type

16" 54" swing, 72"/120" cc ... L10
16" 54" swing, 72"/132" cc ... L10
16" 54" swing, 84"/120" cc ... L10
16" 54" swing, 96"/156" cc ... L10
16" 54" swing, 96"/144" cc ... L10
16" 54" swing, 110"/166" cc ... L10
16" 54" swing, 120"/192" cc ... L10
16" 54" swing, 144"/228" cc ... L10
16" 54" swing, 168"/264" cc ... L10
16" 54" swing, 192"/300" cc ... L10
16" 54" swing, 216"/336" cc ... L10
16" 54" swing, 240"/372" cc ... L10
17" 54" swing, 45"/85" cc ... L10
17" 54" swing, 60"/96" cc ... L10
17" 54" swing, 62"/94" cc ... L10
20" 60" swing, 24"/48" cc, plus any additional length in 2" increments ... N6
20" 60" swing, 24"/48" cc ... S15
20" 60" swing, 72"/120" cc ... S15
20" 60" swing, 96"/156" cc ... S15
20" 60" swing, 120"/192" cc ... S15
20" 60" swing, 144"/228" cc ... S15
20" 60" swing, 168"/264" cc ... S15
20" 60" swing, 192"/300" cc ... S15
20" 60" swing, 96"/156" cc ... L10
20" 60" swing, 120"/192" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 144"/228" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 168"/264" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 192"/300" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 216"/336" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 240"/372" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 264"/408" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 288"/444" cc ... L10
Hollow Spindle ... L10
20" 60" swing, 48"/90" cc, plus any additional length in 2" increments ... N6
20" 60" swing, 72"/120" cc ... S15
28" 50" swing, 96"/156" cc ... S15
28" 50" swing, 120"/192" cc ... S15
28" 50" swing, 144"/228" cc ... S15
28" 50" swing, 168"/264" cc ... S15
28" 50" swing, 192"/300" cc ... S15
28" 50" swing, 216"/336" cc ... S15
32" 60" swing, 84"/144" ... L10
32" 60" swing, 108"/180" cc ... L10
32" 60" swing, 132"/216" cc ... L10
32" 60" swing, 156"/252" cc ... L10
32" 60" swing, 180"/288" cc ... L10
32" 60" swing, 204"/324" cc ... L10
32" 60" swing, 228"/360" cc ... L10
32" 60" swing, 252"/396" cc ... L10
32" 60" swing, 276"/432" cc ... L10
32" 60" swing, 300"/468" cc ... L10
32" 100" swing, 48" cc ... A26
32" 100" swing, 72" cc ... A26
32" 100" swing, 96" cc ... A26
32" 100" swing, 120" cc ... A26
32" 125" swing, 48" cc ... A26
32" 125" swing, 72" cc ... A26
32" 125" swing, 96" cc ... A26
32" 125" swing, 120" cc ... A26

Hollow Spindle

16" swing, 30" cc ... L10
16" swing, 54" cc ... L10
16" swing, 78" cc ... L10
16" swing, 102" cc ... L10
16" swing, 126" cc ... L10
16" swing, 150" cc ... L10
16" swing, 174" cc ... L10
16" swing, 198" cc ... L10
16" swing, 222" cc ... L10
16" swing, 246" cc ... L10
18" swing, 24" cc ... L15
18" swing, 48" cc ... L15
18" swing, 72" cc ... L15
18" swing, 97" cc ... L15
18" swing, 121" cc ... L15
18" swing, 145" cc ... L15
18" swing, 169" cc ... L15
18" swing, 193" cc ... L15
18" swing, 217" cc ... L15
18" swing, 241" cc ... L15
18" swing, 265" cc ... L15
18" swing, 289" cc ... L15
20" swing, 24" cc ... L15
20" swing, 48" cc, Oil Country ... A26
20" swing, 48" cc ... L10
20" swing, 49" cc ... L15
20" swing, 72" cc, Oil Country ... A26
20" swing, 72" cc ... L10
20" swing, 73" cc ... L15
20" swing, 96" cc, Oil Country ... A26
20" swing, 96" cc ... L10
20" swing, 97" cc ... L15
20" swing, 120" cc, Oil Country ... A26
20" swing, 120" cc ... L10
20" swing, 121" cc ... L15
20" swing, 144" cc, Oil Country ... A26
20" swing, 144" cc ... L10
20" swing, 145" cc ... L15
20" swing, 168" cc, Oil Country ... A26
20" swing, 168" cc ... L10
20" swing, 169" cc ... L15
20" swing, 192" cc, Oil Country ... A26
20" swing, 192" cc ... L10
20" swing, 193" cc ... L15
20" swing, 216" cc, Oil Country ... A26
20" swing, 216" cc ... L10
20" swing, 217" cc ... L15
20" swing, 240" cc, Oil Country ... A26
20" swing, 240" cc ... L10
20" swing, 241" cc ... L15
20" swing, 264" cc, Oil Country ... A26
20" swing, 264" cc ... L10
20" swing, 265" cc ... L15
20" swing, 288" cc, Oil Country ... A26
20" swing, 288" cc ... L15
20" swing, 312" cc, Oil Country ... A26
20" swing, 336" cc ... A26
20" swing, 370" cc, Oil Country ... A26
20" swing, 394" cc, Oil Country ... A26
20" swing, 418" cc, Oil Country ... A26
25" swing, 48" cc, Oil Country ... A26
25" swing, 48" cc ... L15
25" swing, 48" cc, Oil Country ... L26
25" swing, 62" cc, Oil Country ... A26
25" swing, 72" cc ... L15
25" swing, 72" cc, Oil Country ... L26
25" swing, 96" cc ... L15
25" swing, 96" cc, Oil Country ... A26
25" swing, 96" cc ... L15
25" swing, 96" cc, Oil Country ... L26
25" swing, 110" cc, Oil Country ... A26
25" swing, 120" cc ... L15
25" swing, 120" cc, Oil Country ... L26
25" swing, 131" cc, Oil Country ... A26
25" swing, 144" cc ... L15
25" swing, 144" cc, Oil Country ... L26
25" swing, 158" cc, Oil Country ... A26
25" swing, 168" cc ... L15
25" swing, 168" cc, Oil Country ... L26
25" swing, 182" cc, Oil Country ... A26
25" swing, 192" cc ... L15
25" swing, 192" cc, Oil Country ... L26
25" swing, 206" cc, Oil Country ... A26
25" swing, 216" cc ... L15
25" swing, 216" cc, Oil Country ... L26
25" swing, 230" cc, Oil Country ... A26
25" swing, 240" cc ... L15
25" swing, 240" cc, Oil Country ... L26
25" swing, 254" cc, Oil Country ... A26
25" swing, 264" cc ... L15
25" swing, 264" cc, Oil Country ... L26
25" swing, 278" cc, Oil Country ... A26
25" swing, 288" cc ... L15
25" swing, 288" cc, Oil Country ... L26
25" swing, 302" cc, Oil Country ... A26
25" swing, 312" cc ... L15
25" swing, 326" cc, Oil Country ... A26
25" swing, 340" cc, Oil Country ... A26
25" swing, 354" cc, Oil Country ... A26
25" swing, 368" cc, Oil Country ... A26
26" swing, Oil Country ... C36
27" swing, 48" cc ... L10
27" swing, 72" cc ... L10
27" swing, 96" cc ... L10
27" swing, 120" cc ... L10
27" swing, 144" cc ... L10
27" swing, 168" cc ... L10
27" swing, 192" cc ... L10
27" swing, 216" cc ... L10
27" swing, 240" cc ... L10
27" swing, 264" cc ... L10
27" swing, 288" cc ... L10
27" swing, 312" cc ... L10
27" swing, 336" cc ... L10
30" swing, Oil Country ... C36
30" swing, 68" cc ... L10
30" swing, 92" cc ... L10
30" swing, 116" cc ... L10
30" swing, 140" cc ... L10
30" swing, 164" cc ... L10
30" swing, 188" cc ... L10
30" swing, 212" cc ... L10
30" swing, 236" cc ... L10
30" swing, 260" cc ... L10
30" swing, 284" cc ... L10
30" swing, 308" cc ... L10
30" swing, 332" cc ... L10
30" swing, 356" cc ... L10

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Heavy Duty Engine Lathes

Hollow Spindle
(Continued)

32" swing, 38" cc, Oil Country ... A26
32" swing, 60" cc ... L15
32" swing, 62" cc, Oil Country ... A26
32" swing, 84" cc ... L15
32" swing, 86" cc, Oil Country ... A26
32" swing, 108" cc ... L15
32" swing, 110" cc, Oil Country ... A26
32" swing, 132" cc ... L15
32" swing, 134" cc, Oil Country ... A26
32" swing, 156" cc ... L15
32" swing, 158" cc, Oil Country ... A26
32" swing, 180" cc ... L15
32" swing, 182" cc, Oil Country ... A26
32" swing, 204" cc ... L15
32" swing, 206" cc, Oil Country ... A26
32" swing, 228" cc ... L15
32" swing, 230" cc, Oil Country ... A26
32" swing, 252" cc ... L15
32" swing, 254" cc, Oil Country ... A26
32" swing, 276" cc ... L15
32" swing, 278" cc, Oil Country ... A26
32" swing, 300" cc ... L15
32" swing, 302" cc, Oil Country ... A26
32" swing, 324" cc ... L15
32" swing, 326" cc, Oil Country ... A26
32" swing, 348" cc ... L15
32" swing, 350" cc, Oil Country ... A26
32" swing, 372" cc ... L15
32" swing, 374" cc, Oil Country ... A26
32" swing, 398" cc, Oil Country ... A26
36" swing, 60" cc ... L15
36" swing, 84" cc ... L15
36" swing, 108" cc ... L15
36" swing, 132" cc ... L15
36" swing, 156" cc ... L15
36" swing, 180" cc ... L15
36" swing, 204" cc ... L15
36" swing, 228" cc ... L15
36" swing, 252" cc ... L15
36" swing, 276" cc ... L15
36" swing, 300" cc ... L15
36" swing, 324" cc ... L15
36" swing, 348" cc ... L15
36" swing, 372" cc ... L15

Turret Lathes

Bench & Floor Light Duty, Turret Attachment

1½" bar capacity ... O5
3.92" swing, ⅝" collet cap ... L19
3.92" swing, ½" collet cap ... L19
5½" swing, ¼" collet ... S36
7" swing, ⅝" collet ... S36
7" swing, ½" collet ... S36
9" swing, ⅝" collet ... R11
7" swing, ¼" collet, Pedestal ... W1
7" swing, 1" collet Pedestal ... W1
9" swing, ½" collet, Bench ... S25
9" swing, ½" collet, Floor ... S25
9" swing, ⅝" bar ... E9
9" swing, ¼" collet ... S36
9" swing, ½" bar ... E9
9" swing, 1" collet ... S36
9" swing, 1" bar ... E9
9" swing, 17" cc, 1" collet ... H9
10" swing, 1" collet Bench ... S25
10" swing, 1" collet, Floor ... S25
10" swing, 13" bed, Floor and Pedestal ... L27
11" swing, 13" bed, Floor and Pedestal ... L27
12" swing, 13" bed, Floor and Pedestal ... L27
12" swing, 1¼" collet ... S36
16" swing, 1" collet, Floor ... S25

Ram Type, Plain

⅝" dia. bar, Hand Feed ... B11
⅝" dia. bar ... B7
⅝" dia. bar, Hand Feed ... B11
⅝" dia. bar ... S38
⅝" dia. bar, Electro-Cycle ... W9
1" dia. bar ... B7
1" dia. bar, Hand Feed ... B11
1" dia. bar ... W9
1" dia. bar, Electro-Cycle ... W9
1" dia. bar, 11" swing ... M31
1" dia. bar, 1¼" dia tubing ... B7
1¼" dia. bar ... S38
1¼" dia. bar ... S15
1¼" dia. bar ... B7
1¼" dia. bar, 2" dia tubing ... B7
1¼" dia. bar, 18½" swing ... G10
1¼" dia. bar, Electro-Cycle ... W9
1¼" dia x 10" lath., Electro-Cycle ... W9
2" dia. bar, 18½" swing ... G10
2½" dia. bar, 18½" swing ... G10
4" dia. tube, 18½" swing ... G10

Ram Type, Universal

1" dia. bar ... W9
1¼" dia. bar, 2" tubing ... B7
1¼" bar, 10" turning lgth. ... J5
1¼" dia. bar, 16½" swing ... M31
1¼" bar, 10" turning lgth. ... J5
2" dia. bar ... B7
2" dia. bar ... W9
2" dia. bar, 2½" dia tubing ... B7
2" dia. bar, 16½" swing ... M31
2½" dia. bar ... B7
2½" dia. bar ... W9
2½" bar, 14" turning lgth. ... J5
21" dia. bar, 22" swing ... M31
3" dia. bar ... B7
3½" dia. bar, 4½" dia tubing ... B7
3" bar, 14" turning lgth. ... J5

Saddle Type, Standard

2½" bar, 10" turning lgth. ... J5
2½" dia. bar, 16" swg. ... W9
2½" dia. bar, 16½" swing ... G10
2½" dia. bar, 21" swing, Fixed Center ... B7
3" bar, 10" turning lgth. ... J5
3" dia. bar, 16" swg. ... W9
3" dia. bar, 21" swing, Fixed Center ... B7
3½" bar, 32" turning lgth. ... J5
3½" bar, 10" turning lgth. ... J5
3½" dia. bar, 20" swg. ... W9
3½" dia. bar, 23" swing ... G10
3½" dia. bar, 24" swing, Fixed Center ... B7
4" bar, 10" turning lgth. ... J5
4½" bar, 56" turning lgth. ... J5
4½" dia. bar, 23" swing ... W9
4½" dia. bar, 24" swing, Fixed Center ... B7
4½" dia. bar, 28½" swing ... G10
5" bar, 31" turning lgth. ... J5
6" dia. bar, 28" swing ... W9
6½" dia. bar, 28½" swing ... G10
6½" bar, 63" turning lgth. ... J5
8" bar, 20" turning lgth. ... J5
8" dia. bar, 25½" swing ... W9
9" dia. bar, 28" swing ... W9
9½" dia. bar, 31½" swing ... G10
9½" dia. bar, 36½" swing ... G10
12" dia. bar, 28" swing ... W9
12½" dia. bar, 31½" swing ... G10
12½" dia. bar, 36½" swing ... G10

Saddle Type, Cross-Sliding Turret

2½" dia. bar, 19½" swing ... G10
2" bar, 34" turning lgth. ... J5
3" dia. bar, 23" swing ... G10
3½" bar, 34" turning lgth. ... J5
4½" dia. bar, 28½" swing ... G10
4" bar, 32" turning lgth. ... J5
6¼" dia. bar, 28½" swing ... G10
9½" dia. bar, 31½" swing ... G10
9½" dia. bar, 36½" swing ... G10
12½" dia. bar, 31½" swing ... G10
12½" dia. bar, 36½" swing ... G10

Saddle Type, Flat Turret

2½" bar, 10" turning lgth. ... J5
2½" dia. bar x 16" swing ... W9
3" bar, 10" turning lgth. ... J5
3" dia. bar x 16" swing ... W9
3½" dia. bar x 20" swing ... W9
4½" dia. bar x 23½" swing ... W9
6" dia. bar x 23" swing ... W9
8" dia. bar x 25¼" swing ... W9
9" dia. bar x 28" swing ... W9
12" dia. bar x 28" swing ... W9

Saddle Type, Flat Turret, Cross-Sliding Headstock

17" or 19" swing, Double Spindle ... L5

Chucking Lathes

Single Spindle, Horizontal Automatic

8" swing ... S27
8½" dia. chucking swg. ... W9
9½" swing ... P14
10¼" swing, 1" collet ... H9
10½" dia. chucking swg. ... W9
12" swing, 18" cc ... L23
12" swing ... N1
12" swing ... S27
13" swing, 1" collet ... H9
16" swing ... S27
21" dia. swing ... G10
21" swing ... P14
24" swing ... S27
25" swing ... P14
25¼" dia. swing ... G10
25½" swing ... P14
26½" dia. swing ... G10
30" swing ... P14
33½" swing ... G10
34" swing ... P14
36" swing ... P14
1¼" dia. cap. ... M37
2½" dia. cap. ... M37
3" dia. cap. ... M37
5" dia. cap. ... M37

Single Spindle, Vertical Automatic

15" swing or Special, Automatic Speed Change ... B50
16" swing, 9" bore ... P22
34" swing ... M37

Multiple Spindle, Horizontal Automatic

⅝" dia. cap., Double Spindle ... M37
1¼" dia. cap., Double Spindle ... M37
5" swing, 6 spindle ... N1
5¼" swing, 6 spindle, Tool Rotating ... N7
5½" swing, 4 spindle, Tool Rotating ... N7
5½" swing, 6 spindle ... N7
5½" swing, 6 spindle ... C34
6" swing, 4 spindle, Tool Rotating ... G15
6" swing, 5 spindle, Tool Rotating ... N7
6" swing, 5 spindle ... W9
6" swing, 5 spindle ... N1
6½" swing, 6 spindle ... N7
6¼" swing, 4 spindle ... N7
6¼" swing, 5 spindle ... N7
7" swing, 6 spindle ... B1
7½" swing, 4 spindle ... N7
7½" swing, 6 spindle ... N7
7½" swing, 6 spindle ... C34
8" swing, 6 spindle ... N1
8" swing, 8 spindle ... N1
8" swing, 8 spindle ... N7
8½" swing, 4 spindle, Tool Rotating ... G15
9" swing, 4 spindle ... N7
9½" swing, 6 spindle ... N7
10" swing, 4 spindle ... N1

LATHES

(Code number following each listing indicates manufacturer, key on page 82)

Chucking Lathes

Multiple Spindle, Horizontal Automatic

(continued)

10" swing, 6 spindle N1
10¼" swing, 6 spindle N7
11" swing, 4 spindle, Tool Rotating G15
11¾" swing, 4 spindle N7
12" swing, 2 spindle M37
12" swing, 4 spindle N1
12" swing, 6 spindle N1
10½" cc, 5 face turret P14
14½" cc, 5 face turret P14
Three Way, 6 spindle Tool Rotating G15

Multiple Spindle, Vertical Automatic

¾" dia., cap, 4 spindle M37
1¼" dia., cap, 4 spindle M37
2" dia., cap, 4 spindle M37
3" dia., cap, 4 spindle M37
¾" dia., 4 spindle, Continuous B1
¾" dia., 6 spindle B51
¾" dia., 8 spindle B51
9½" dia., 16 spindle B51
10" dia., 4 spindle B51
10" dia., 6 spindle B51
10" dia., 12 spindle B51
10¼" dia., 8 spindle B51
12" dia., 6 spindle B51
12" dia., 8 spindle B51
12" swing, 2 spindle M37
14" dia., 4 spindle B51
14" dia., 6 spindle B51
16" dia., 6 spindle B51
16" dia., 8 spindle B51
16" dia., 8 spindle B51
20" dia., 4 spindle B51
20" dia., 6 spindle B51
9" swing, 5 spindle C23
9" swing, 12" travel, 2 spindle C23

Chucking Right Angle Carriage

60" swing L26

Chucking Right Angle Carriage Automatic

18" cc, Lathe, Engraver M32
60" swing M32

Automatic Between Centers Chucking Lathes

Horizontal Single Spindle

1½" dia., 15" long P17
4.25" swing, 1" cc B7
15" swing, 8" cc S8
15" swing, 16" cc S8
15" swing, 22" cc S8
15" swing, 14" cc S8
15" swing, 16" cc S8
15" swing, 20" cc S8
15" swing, 40" cc S8
15" swing, 60" cc S8
15" swing, 80" cc S8
15" swing, 14" cc J5
15" swing, 21" cc J5
15" swing, 33" cc J5
15" swing, 42" cc J5
9¾" swing, 15" cc S13
8¾" swing, 24" cc S13
8¾" swing, 36" cc S13
10" swing, 20" cc Hand Screw M32
10" swing, 36" cc S8
12" table travel, 7½" width S13
12" swing, 15" cc J5
12" swing, 21" cc J5
12" swing, 24" cc G10
12" swing, 33" cc J5
12" swing, 42" cc J5
12" swing, 60" cc J5
12" swing, 84" cc J5
12" swing, 99" cc J5
12¼" swing, 18" cc S13
12¼" swing, 24" cc S13
12¼" swing, 36" cc S13
12½" swing, 48" cc S13
12½" swing, 60" cc S13
13" swing, 24" cc, Hydraulic G10
13¼" swing, 24" cc S13
13¼" swing, 36" cc S13
13¼" swing, 48" cc S13
13¼" swing, 60" cc S13
16" swing, 21" cc J5
16" swing, 33" cc J5
16" swing, 42" cc J5
16" swing, 60" cc J5
16" swing, 84" cc J5
16" swing, 99" cc J5
14" swing, 36" cc S13
14" swing, 60" cc S13
14" swing, 84" cc S13
18" table travel, 8" width S13
18" table travel, 10¾" width S13
20" swing, 24" cc J5
20" swing, 24" cc L26
20" swing, 16" cc J5
20" swing, 33" cc L26
20" swing, 42" cc L26
20" swing, 60" cc J5
20" swing, 63" cc L26
20" swing, 63" cc J5
20" swing, 94" cc J5
24" table travel, 12" width S13
24½" swing, 36" cc G10
36" table travel, 12" width S13
42" table travel, 12" width S13
42" table travel, 14" width S13
42" table travel, 18" width S13
42" table travel, 24" width S13
42" table travel, 14" width S13
42" table travel, 18" width S13
42" table travel, 24" width S13
96" table travel, 30" width S13
96" table travel, 24" width S13
96" table travel, 30" width S13
120" table travel, 18" width S13
120" table travel, 24" width S13
120" table travel, 30" width S13
144" table travel, 24" width S13
144" table travel, 30" width S13
168" table travel, 24" width S13
168" table travel, 30" width S13
Special S25

Multiple Spindle

42" swing, 84" cc, Horizontal B51

Automatic Screw Bar Machines

Horizontal Single Spindle

164" dia., 1¼" long T14
⅛" bar cap., Swiss Type D10
¼" dia. bar, Pinion Turning B14
320" dia., 2½" long T14
⅝" dia. bar B14
⅝" dia. bar, Screw Threading B14
435" dia., 3½" long T14
½" bar cap., Swiss Type D10
¼" dia. bar G14
⅝" dia. bar B14
⅝" dia. bar B14
1" dia. P13
1¼" dia. bar C20
1¼" dia. cap M37
1⅜" dia. bar C20
1½" dia. bar B14
1⅝" dia. bar C20
1⅝" dia. bar C20
2¼" dia. bar C20
2¼" dia. cap M37
2⅜" dia. bar N7
3" dia. cap M37
3½" dia. bar C34
3½" dia. bar N1
4¼" dia. bar C20
1¼" dia. bar C20
1¼" dia. bar C20
1⅜" dia. bar C20
1½" dia. bar C20
1⅝" dia. bar C20
1⅝" dia. bar C20
1⅝" dia. bar C20
2¼" dia. bar C20
2⅜" dia. bar N7
2⅜" dia. bar C20
2½" dia. bar C20
2⅝" dia. bar C20
2⅝" dia. bar C20
2⅝

LATHES

Code number following each listing indicates manufacturer, key on page 521

Lathes Not Elsewhere Classified

Axle

cc 9' max., End Drive B4
26" swing, 9' cc, Journal Burnishing B4
Special, Center Drive, Car....C36
Special, End Drive, Locomotive C36
Special, Car Axle Burnishing..C36
Special, Locomotive Journal Turning B4
Special, Journal Truing C36
Special, Axle and Journal Truing C36
Special, Dual End Drive Journal Truing and Axle....C36

Crankshaft

1" max. throw, 6' bed, Double End Drive L10
1" max. throw, 7' bed, Double End Drive L10
3 bearing shaft, Line Bearing L10
3, 4, & 5 bearing shaft, Line Bearing L10
3, 4, & 5 bearing shaft, Automatic, 4-station L10
4 cylinder, 3 main brg., Pins.. L10
6 cylinder, 3 main brg., Pins.. L10
6 cylinder, 4 main brg., Pins.. L10
8 cylinder, 5 main brg., Pins.. L10
10" swing, 60" length, Camshaft, all Cam Contours Simultaneously... C16
20" swing W19
20" swing, 60" length, Contour Web Turning C16
20" swing, 60" length, Pin Turning and Cheek Facing C16
26" swing W19
7" max. crank throw, Crankpin W19
9" max. crank throw, Crankpin W19
14" max. crank throw, Crankpin W19
21" max. crank throw, Crankpin W19
18" swing, Single End W19
28" swing-over-bed, Single End W19
36" swing-over-bed, Single End W19
37" swing-over-bed, Single End W19
48" swing-over-bed, Single End W19
61" swing-over-bed, Single End W19
28" swing-over-bed, Double End W19
34" swing-over-bed, Double End W19
36" swing-over-bed, Double End W19
37" swing-over-bed, Double End W19
11" swing-over-bed, Double End W19
18" swing-over-bed, Double End W19
66½" swing-over-bed, Double End W19
Special, Double End W19
Contour Turning W19
11" swing-over-bed, Center Drive W19
12½" swing-over-bed, Center Drive W19
14¾" swing-over-bed, Center Drive W19
20½" swing-over-bed, Center Drive W19
45" swing-over-bed, Center Drive W19
56" max. length connecting, Center Drive W19
68" swing, 26' cc E15
78" swing, 26' cc, Pin Turning E15

Shell

75 mm, Bore Nose, Less Threading B10
75 mm, Bore, Ream, Recess and Profile Nose B10
75 mm, Bourrelet Turning or Correction B10
75 mm, Center Base and Cut-Off Skirt B10
75 mm, Face Base, Turn Boat Tail and Weight Correction B10
75 mm, Face Base and Finish Boat Tail B10
75 mm, Face Base and Turn Band Groove B10
75 mm, Turn, Contour, Face Base and Cut-Off Skirt B10
75 mm, Turn, Cut-Off Skirt and Face Base B10
75 mm, Turn and Face Base. B10
75 mm, Turn-and-Trim Driving Band B10
75 to 90 mm S29
90 mm, Bore Nose, Less Threading B10
90 mm, Bore, Ream, Recess and Profile Nose B10
90 mm, Bourrelet Turning or Correction B10
90 mm, Center Base and Cut-Off Skirt B10
90 mm, Face Base, Turn Boat Tail and Weight Correction B10
90 mm, Face Base and Finish Boat Tail B10
90 mm, Face Base and Turn Band Groove B10
90 mm, Turn, Contour, Face Base and Cut-Off Skirt B10
90 mm, Turn, Cut-Off Skirt and Face Base..... B10
90 mm, Turn and Face Base. B10
90 mm, Turn-and-Trim Driving Band B10
90 mm & 105 mm Shell M34
90 mm, 105 mm & 155 mm shell M34
105 mm, Bore Nose, Less Threading B10
105 mm, Bore, Ream, Recess and Profile Nose B10
105 mm, Bourrelet Turning or Correction B10
105 mm, Center Base and Cut-Off Skirt B10
105 mm, Face Base, Turn Boat Tail and Weight Correction B10
105 mm, Face Base and Finish Boat Tail B10
105 mm, Face Base and Turn Band Groove B10
105 mm, Turn, Contour, Face Base and Cut-Off Skirt B10
105 mm, Turn, Cut-Off Skirt and Face Base..... B10
105 mm, Turn and Face Base B10
105 mm, Turn-and-Trim Driving Band B10
105 to 155 mm S29
105 mm & 155 mm shell M34
155 mm, Bore Nose, Less Threading B10
155 mm, Bore, Ream, Recess and Profile Nose B10
155 mm, Bourrelet Turning or Correction B10
155 mm, Center Base and Cut-Off Skirt B10
155 mm, Face Base, Turn Boat Tail and Weight Correction B10
155 mm, Face Base and Finish Boat Tail B10
155 mm, Face Base and Turn Band Groove B10
155 mm, Turn, Contour, Face Base and Cut-Off Skirt B10
155 mm, Turn, Cut-Off Skirt and Face Base B10
155 mm, Turn and Face Base B10
155 mm, Turn-and-Trim Driving Band B10
280 mm shell M34
8" to 240 mm S29
8" to 240 mm shell M34
9½" shell W19
36" swing, 12" shell size W19
36" swing 16" shell size W19

Cartridge Case Trimming & Head Finishing

½" to 2" dia., Finishing C41
10 mm to 6" dia., Cut-Off & Trimming C41
2½" to 4" dia., Finishing C41
4" to 6" dia., Finishing C41
6" to 8" dia., Finishing C41
8" to 10¼" dia., Finishing....C41
50 cal. Head Turning, Inclined a Spindle B1

Relieving Lathes

14" to 21" swings S28

Others

Special, Aircraft Cylinder Sleeve B10
¾" dia., Edging or Trimming W10
¾" dia., Five Spindle, Oblique, Auto. Continuous.. B1
1¼" dia., Edging & Forming W10
1¼" dia., Edging or Trimming W10
1½" swing, 2½" shell Length, Arbor, Semi-Automatic W10
2" dia., Edging or Trimming W10
2½" dia., Edging or Trimming W10
2¾" dia., Edging or Trimming W10
3" dia., 10" length, Beading, Double End W10
3½" swing, 3" shell length, Arbor, Semi-Automatic W10
7½" swing, Trimming, Double End W10
8½" swing, 5" shell length.. W10
9" swing, 1¼" collet, Chasing Bar R11
11" to 24" drums, Drum Lathe W2
11¼" swing, 7" shell length..W10
12" swing, 2¼" collet, Chasing Bar R11
14½" swing, 8" shell length.. W10
16" swing, 4¾" shell length.. W10
16" swing, 11½" shell length W10
21" swing, 12' cc, Grooving....B4
60" swing, 15' cc, Grooving... B4
48" swing, 21' cc, Forge, Boring and Turning B4
30" swing, Forge B4
36" swing, Forge B4
36" swing, Forge E15
42" swing, Forge B4
48" swing, Forge B4
48" swing, Forge E15
60" swing, Forge B4
60" swing, Forge E15
10' to 30' swing, cc special, Roll Turning H60
105" swing, length special, Roll Turning U2
20" swing, 60" cc, Roll Turning Y2
20" swing, 72" cc, 14" dia. roll, Roll-Duplicating A17
20' to 60' swing, Roll Turning M18
24" swing, 72" cc, 20" dia. roll, Roll-Duplicating A17
24" swing, 102" cc, Roll Turning M32
24" swing, 126" cc, Roll Turning M32
27" swing, length special, Roll Turning U2
30" swing, 96" cc, Roll Turning Y2
32" swing, 96" cc 26" dia. roll, Roll-Duplicating A17
36" swing, 126" cc, Roll Turning Y2
36" swing, length special, Roll Turning U2
41" swing, 126" cc, Roll Turning Y2
48" swing, 96" cc 26" dia. roll, Roll-Duplicating A17
48" swing, length special, Roll Turning U2
52" swing, 204" cc, Roll Turning Y2
56" swing, length special, Roll Turning U2
60" max. swing, 30' or special cc, Roll Turning C36
84" swing, 204" cc, Roll Turning Y2
72" swing, length special, Roll Turning U2
6" to 24" dia., Scroll Jaw Cutting C41
6" to 21" dia., Scroll Plate Cutting C41
¼" to 8" dia., Threading C41
Vertical Carwheel B1
42" dia., Wheel Lathe B1
52" dia., Wheel Lathe B1
64" dia., Wheel Lathe B1
Special, Car Wheel C36
42", Driving Wheel B1
56", Driving Wheel B1
90", Driving Wheel B1
Special, Driving Wheel C36
Special, Gun Boring C36
Special, Plain Turning C36
Special, Roughing Lathes C36
72" swing, 10' cc, Turbine Rotors M1
to 2" pipe unions, Union Finishing P16

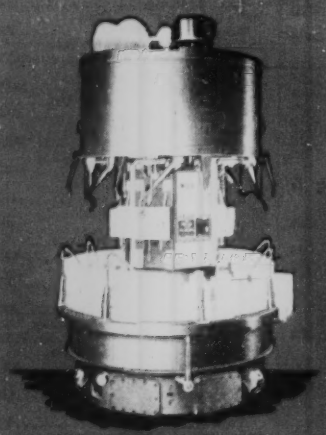
MORE PRODUCTION THROUGH

Modernization

with

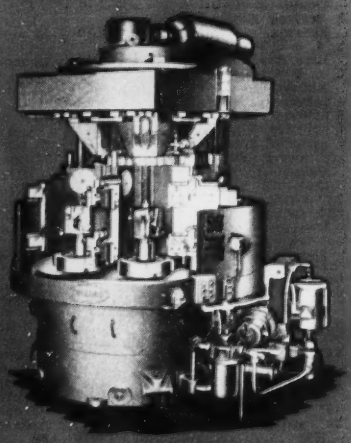
BULLARD

MACHINE TOOLS



MULT-AU-MATIC

Type "D" — 8" — 12" — 16" with 6 or 8 Spindles, Type "D" 16-23" and Type "K" 6 Spindles — and 6 twin Spindles — 8 Spindles and 8 twin Spindles.

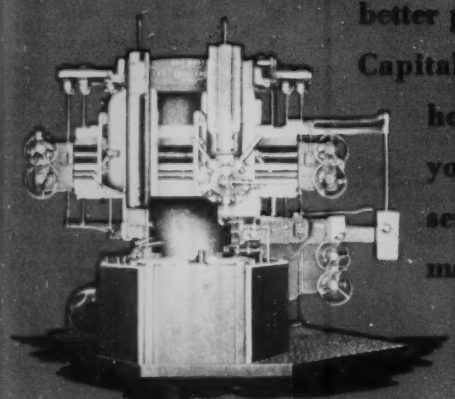


CONTIN-U-MATIC

Types "RD" and "RDH" 3-4-6 and 12 Spindles in 10" — 14" — 20".

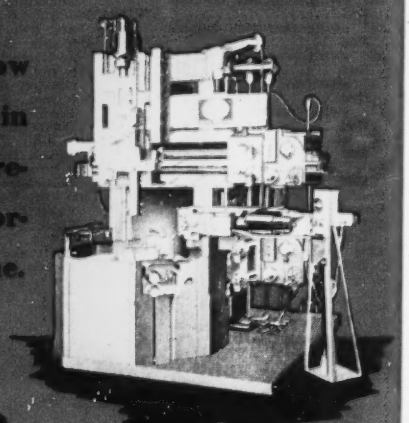
Many complicated and diversified metal working operations are being efficiently performed on Bullard Machine Tools. They speed up production . . . reduce scrap to a minimum . . . produce better pieces at lower cost.

Capitalize on Bullard "know how" as others have—call in your nearest Bullard representative or write for information on the Bullard Line.



CUT MASTER V.T.L.

In six sizes 30" — 36" — 42" — 54" — 64" and 74". The 30" and 36" sizes have two heads while 42" — 54" — 64" and 74" have three heads obtainable in various combinations.



MAN-AU-TROL V.T.L.

In six sizes 30" and 36" with two heads, 42" — 54" — 64" and 74" with three heads.

The

BULLARD

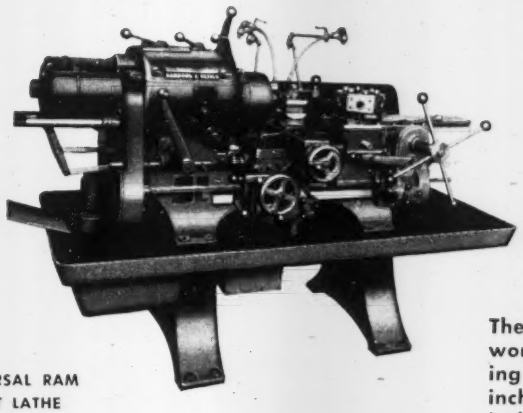
COMPANY

BRIDGEPORT 2, CONN.

PHONE 6-2511

BARDONS & OLIVER Turret Lathes and Cutting-Off Machines are *Outstanding* FOR MAXIMUM PRODUCTION!

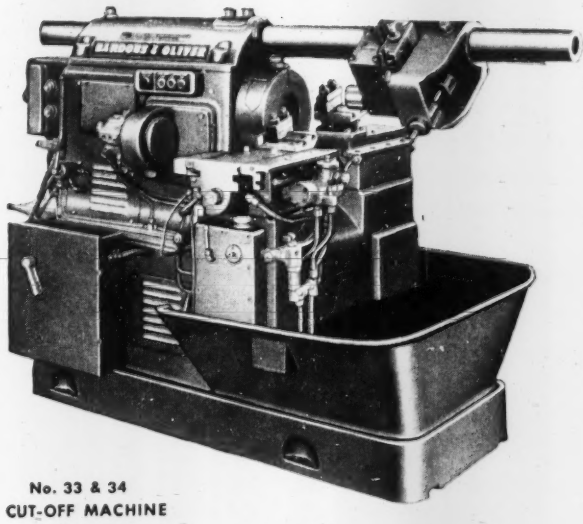
★



No. 3 UNIVERSAL RAM TYPE TURRET LATHE

The five sizes of RAM TYPE TURRET LATHES cover bar work from five-eighths inch diameter, five inches turning length, to four and one-half inches diameter, fifteen inches turning length; swing from eleven and one-half inches to twenty-one and one-half inches. Many time and labor saving features make each an outstanding producer in its range of work.

THE NO. 21 AND NO. 22 SADDLE TYPE TURRET LATHES are exceedingly powerful and rigid for fast production on larger and heavier bar and chucking work. The hydraulic speed preselector, the power traverse to both the cross slide carriage and the saddle, the hydraulic collet chuck and bar feed in combination with many other eminent features make these machines leaders for fast production.

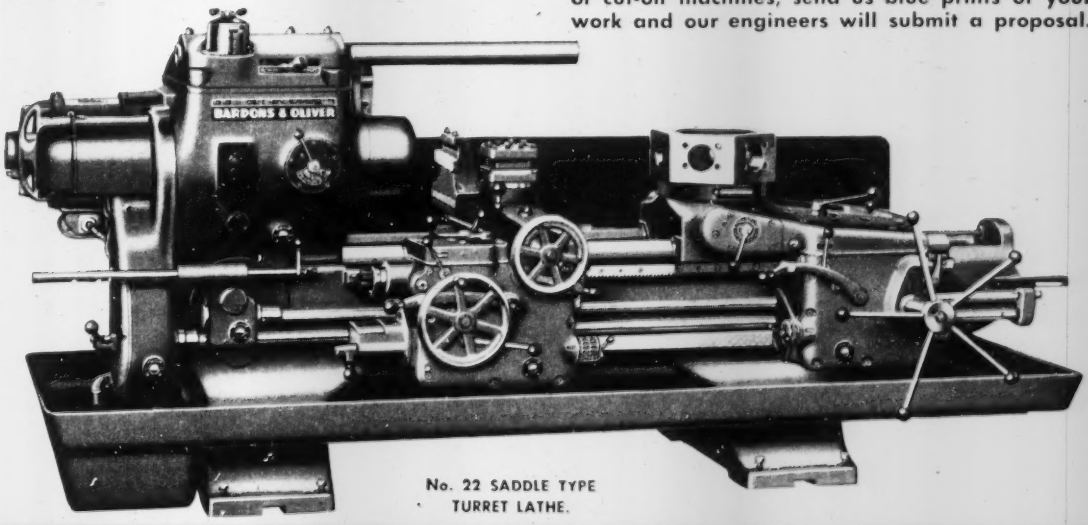


No. 33 & 34 CUT-OFF MACHINE

THE EIGHT SIZES OF CUT-OFF MACHINES range from 2" to 16" and are built as automatic, semi-automatic and hand operated. Each size in this comprehensive line is outstanding for maximum productive capacity and remarkable ease of operation.

AUTOMATIC LOADING TABLES are available for use with each of the above eight cutting-off lathe sizes.

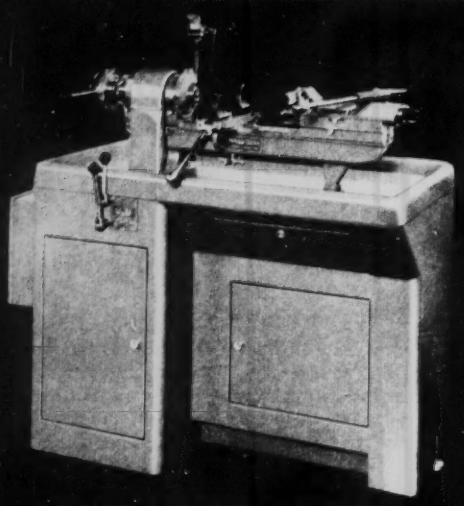
If your production problem involves turret lathes or cut-off machines, send us blue prints of your work and our engineers will submit a proposal.



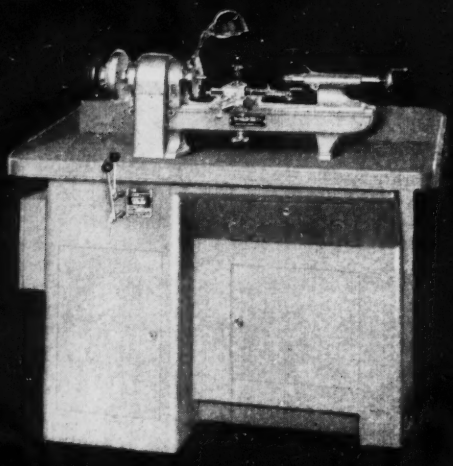
No. 22 SADDLE TYPE TURRET LATHE.

BARDONS & OLIVER, INC.

1147 WEST 9TH STREET • CLEVELAND 13, OHIO



No. 7 **HAND SCREW MACHINE**

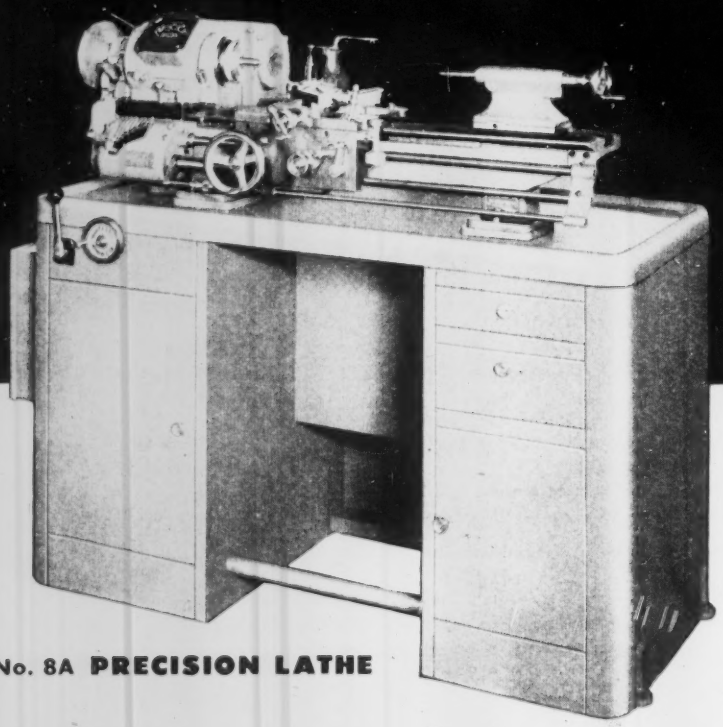


No. 7 **STANDARD LATHE**

Wade

Manufacturers of a complete line of

PRECISION LATHE EQUIPMENT



No. 8A **PRECISION LATHE**

SEND FOR CATALOG

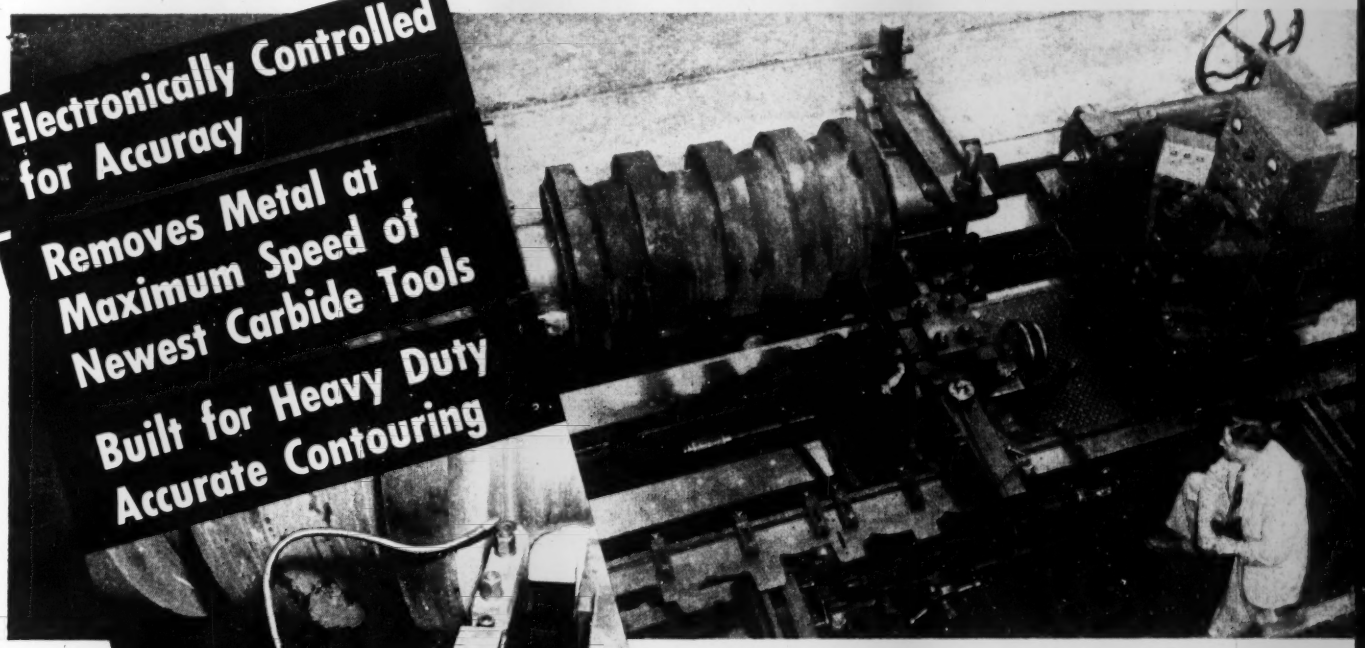
THE WADE TOOL CO., 63 River St., Waltham, Mass.

MACK-HEMP 60" Automatic Contour Turninq Lathe

Electronically Controlled for Accuracy

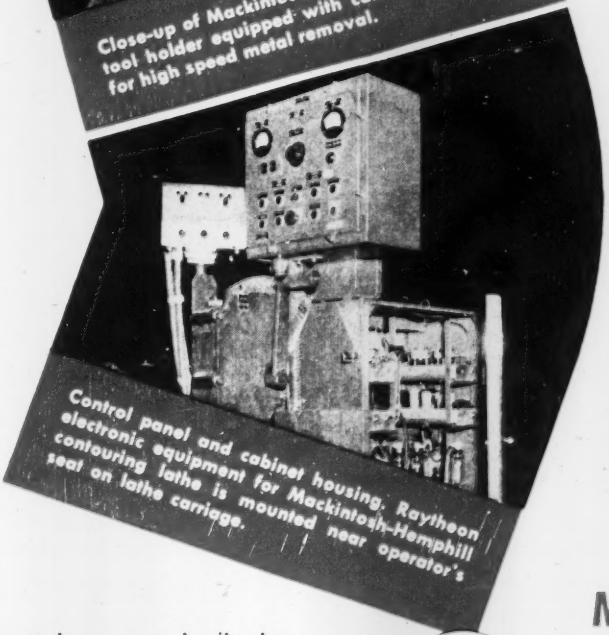
Removes Metal at Maximum Speed of Newest Carbide Tools

Built for Heavy Duty Accurate Contouring



View of working area, Mackintosh-Hemphill 60-inch automatic contour lathe. Machine is turning a cast steel shape roll mounted on neck rests.

Close-up of Mackintosh-Hemphill contour lathe tool holder equipped with carbide button tool for high speed metal removal.



Control panel and cabinet housing Raytheon electronic equipment for Mackintosh-Hemphill contouring lathe is mounted near operator's seat on lathe carriage.

The Mack-Hemp 60" Automatic Contour Turning Lathe, the largest unit of its type ever made, is the only large roll-turning lathe that contours roll bodies while rolls are neck-supported in housings rather than on centers. Rolls up to 54 inches in diameter and 20 feet long can be accommodated in the lathe. Present roll shop practice calls for surface speeds of 60 to 80 feet per minute on iron and over 200 or more feet per minute on steel.

Contour duplication is achieved by the combined action of a cross-feed motor and a longitudinal feed motor, both controlled electronically.

Other outstanding features:

- ample weight, power and rigidity to insure smooth cutting and to handle full present and future cutting tool potential.
- easy and accurate stylus and template adjustment.
- controls, tool and template holder all directly visible to operator.
- hardened and ground wearing plates on all bed ways and cross feed slide.
- vibration free, heavily reinforced tool holder for fast cutting with the newest carbide tools.

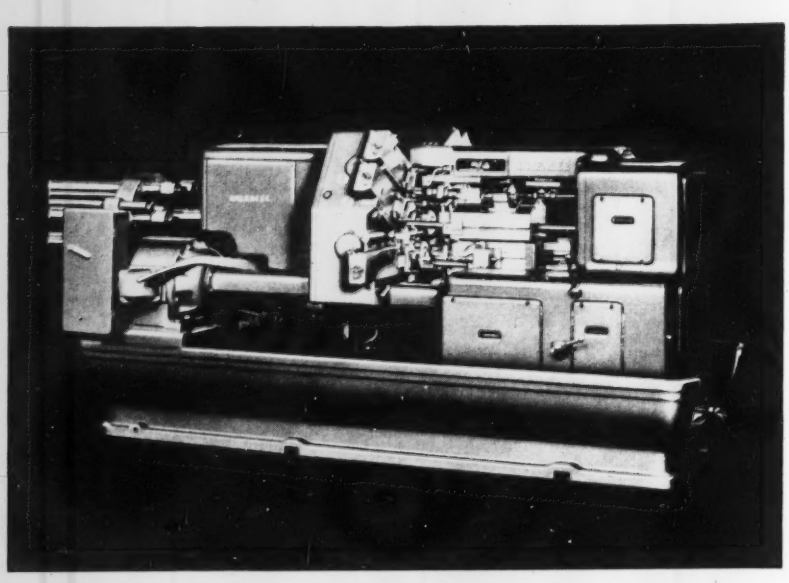
If you want to learn more details about these unusual lathes and what is being accomplished in the nation's largest steel mill roll shops—write to us. It pays to keep your eye on what's new and different at Mack-Hemp.

MACKINTOSH-HEMPHILL CO.

Makers of the Rolls with the Striped Red Wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners . . . heavy duty engine lathes . . . shears . . . steel and special alloy castings . . . completely integrated strip mills . . . shape straighteners . . . end thrust bearings



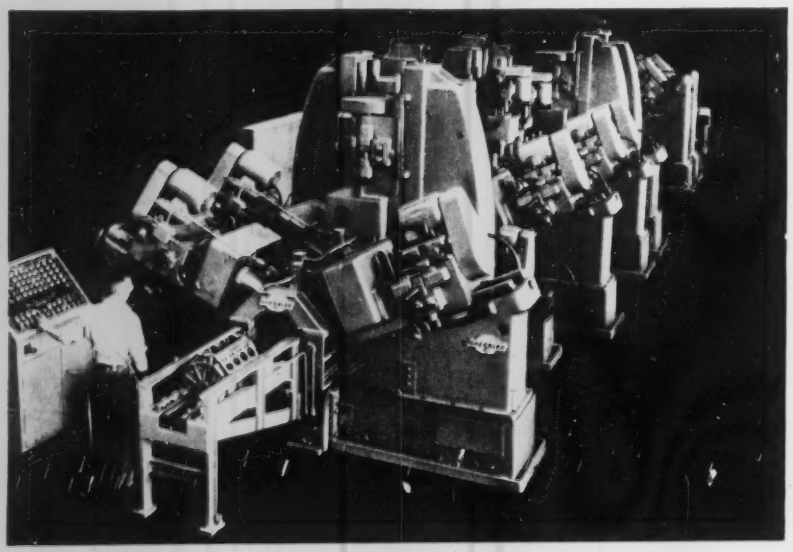
Greenlee Machines feature maximum economy of operation on short-run as well as long-run jobs . . . because of quick change-over, wide-open tooling area, great versatility, low tool cost, and a wide variety of accessories.

The Greenlee "Six" is available in 1", 1-5/8", and 2" capacity — the "Four" in 1-5/8" and 2-5/8" capacity. This range covers the majority of all machine-shop needs.

Automatic Screw Machines

GREENLEE

Special Machine Tools



The first Greenlee "special" machine was designed and built in 1918, and Greenlee was also a pioneer in the development of automatic transfer machines now widely used in the mass-production industries. Greenlee machines are made up of *proved* units and mechanisms, specially combined to perform specific work . . . consequently, they show remarkably good performance right from the start of their operation.

GREENLEE BROS. & CO.
1930 MASON AVENUE
ROCKFORD, ILLINOIS

GREENLEE

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

CUT WITH CONFIDENCE

new

LeBLOND

OF CINCINNATI

HEAVY DUTY ENGINE LATHE

WITH

HIGH-POWER

HEADSTOCK

NOW . . . cut with confidence at high horsepower!

New 32" Headstock Designed for Power

Heavy, short shafts minimize deflection.

Hardened and ground gears for all speeds except low back gear.

Finely-pitched wide gears for better tooth action and greater load-carrying ability.

Exceptionally low no-load-friction-horsepower (max. 3.4 hp @ 500 rpm) is proof of highly-efficient design.

Forced-feed lubrication throughout.

36 Spindle Speeds from 5 to 500 rpm

Direct-reading, color-keyed speed change levers.

New High-capacity 4-bearing Spindle

Radial loads @ 100 rpm:

Front Twin Timkens	73,800 lbs.
Center Double-Row Timken .	39,300 lbs.
Rear Ball Bearing	21,850 lbs.

60 hp Motor

EXCLUSIVE! Adjustable accelerations for starting, stopping, jogging

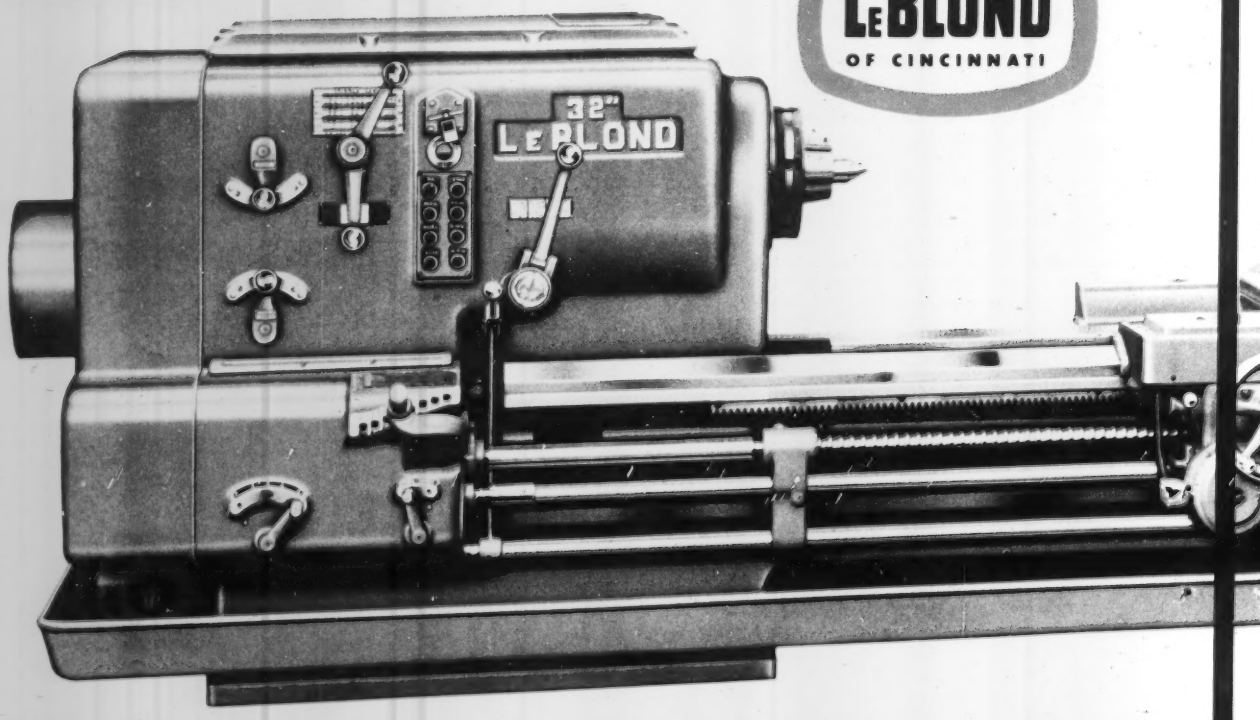
To bring heavy work pieces up to speed safely, torque applied for the first five seconds is adjustable. Any percentage of full torque can be selected for this interval. Similar adjustments can be made for stopping and jogging by means of three rheostatic controls to the electric clutch and electric brake.

Proven in Grueling Field Test

This headstock has been proven in the field on one of the toughest of all lathe jobs—roughing a heavy, out-of-round steel forging. Pulling two carriages, it has been hogging off over 75 cu. in. of metal per min.* The cuts consume a continuous *measured* 50 horsepower. Customer reports complete satisfaction.

*Two tools cutting at an average 1 1/4" depth at 200 ft. per min. equals 75.9 cu. in. per min.

LeBLOND OF CINCINNATI



4-DIRECTIONAL POWER RAPID TRAVERSE

Built as an integral part of the apron, LeBlond Rapid Traverse adds greatly to ease and speed of operation. A single lever controls movement of carriage in both directions and cross slide in and out.

ONE-PIECE APRON, HARDENED RACK

A rugged one-piece, double-wall casting houses the sturdy shafts and gears and the positive-jaw feed clutch. A single lever controls both cross and length feed. All bearings, cross slide and carriage ways are *lubricated automatically*. The rack is flame hardened.

TOTALLY-ENCLOSED QUICK CHANGE BOX

Sealed in an oil-tight casting and lubricated automatically, this quick-change box requires no operator attention. Steel gears are used throughout and sliding gears are mounted on splined shafts. Forty-eight feeds and threads may be quickly set from the direct-reading plate.

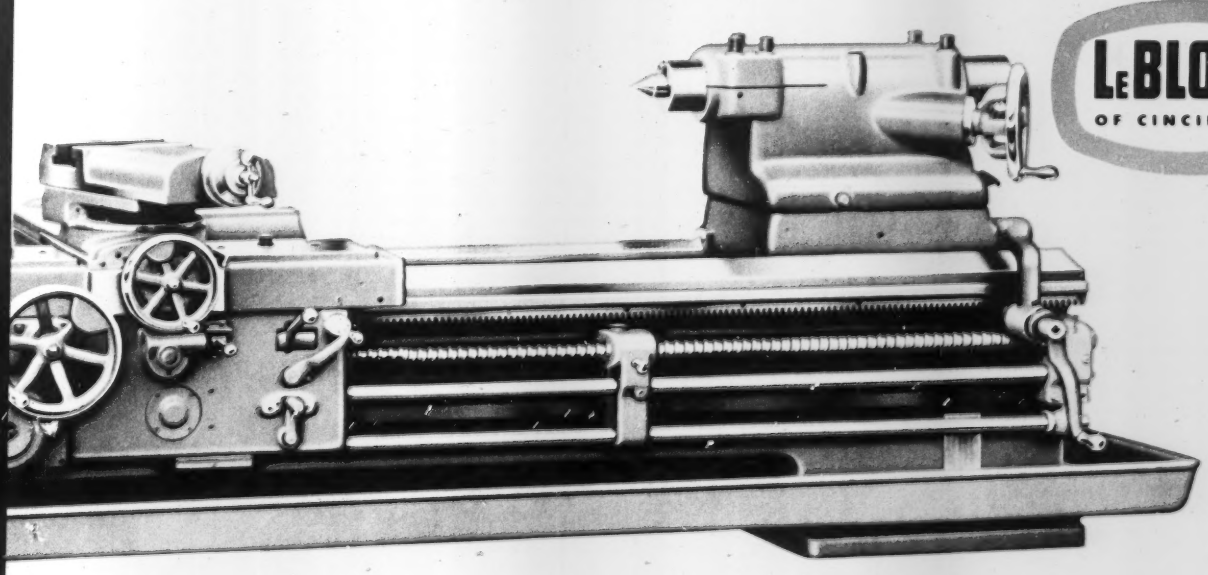
HARDENED AND GROUND STEEL BED WAYS

Of compensating vee-way design, these hardened ways (62-66 Rockwell C, 600 Brinell) are replaceable in the event of accidental damage.

THRUST-LOCK TAILSTOCK

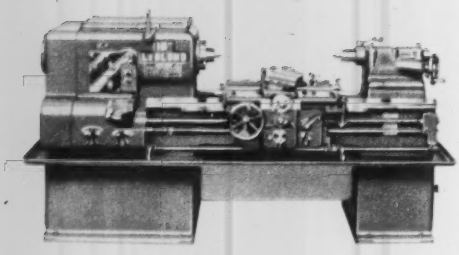
This exclusive LeBlond design, incorporating a worm and rack construction, puts the handwheel at a convenient angle to the operator, provides positive safety lock against thrust and exceptionally long travel. Full-length support when spindle is extended.

Write today for Bulletin HD-164.



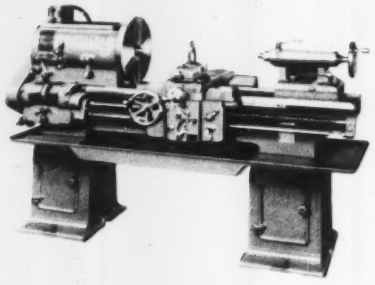
LeBLOND
OF CINCINNATI

SELECT YOUR LATHES FROM LEBLOND'S 76 MODELS



HEAVY-DUTY ENGINE AND TOOLROOM

Free-running spur-gear headstock, 3 and 4-bearing spindles, totally-enclosed quick change box, one-piece apron, thrust-lock tailstock, hardened and ground replaceable steel ways, 4 and 6-way power rapid traverse on larger models. Swings—12″, 14″, 16″, 20″, 25″, 32″, 40″ and 50″.



REGAL

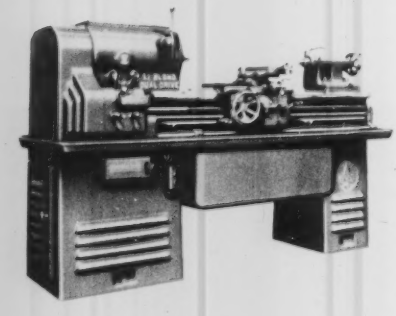
Light-duty lathes with heavy-duty features—ideal for production, job shop work and training. Geared headstock, quick change feed box, separate leadscrew and feed rod, taper key drive spindle nose, one-piece apron. Swings—13″, 15″, 17″, 19″, 21″, 24″, and 13″ bench model. 17″, 19″, 21″, 24″ Gap and 17″/28″ Sliding Bed Gap.

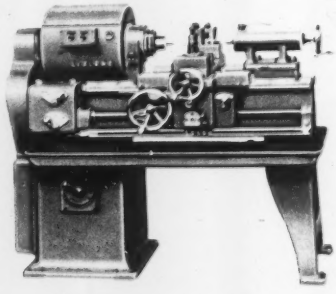
DUAL-DRIVE

15″ swing; twelve speeds, 28 to 1800 rpm; hardened and ground replaceable steel ways; single lever speed control, 96 feeds from .0004″ to .106″; forty-eight threads from 4 to 224; automatic lubrication through headstock and feed box, 3 hp.

RAPID PRODUCTION

Designed *especially* for low-cost high-production turning. *Not* a stripped-down engine lathe. Choice of headstocks gives you speeds within the range *you* choose. Swings—13″, 17″, and 20″.





Crankshaft Lathes—for roughing and finishing all elements of any crank—automatic for mass production. *9 out of 10 crankshaft lathes built today are LeBlond's.*

"Hydra-trace" Duplicating Attachment—for smooth hydraulic tracing of a great variety of contours. Fits any LeBlond built since 1935—except Regals.

Plain and Sliding Bed Gap Lathes—12″, 14″, 16″, 20″, 25″, and 32″; 16″/38″, 25″/50″, 32″/60″.

Hollow Spindle Lathes—16″, 20″, 27″, and 30″.

Contour Facing Lathe—For automatic contour facing of large-diameter work.

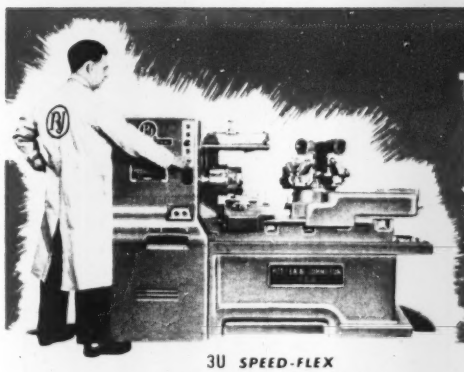
Complete line of lathe attachments.

WRITE TODAY FOR CATALOG 53.

THE R. K. LEBLOND MACHINE TOOL CO., CINCINNATI 8, OHIO

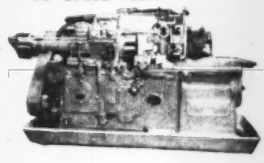
LeBLOND
OF CINCINNATI

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 64 YEARS

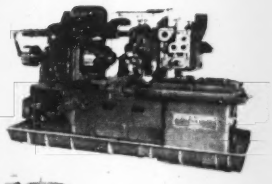


THE COMPLETE LINE OF POTTER & JOHNSTON *Automatic Turret Lathes*

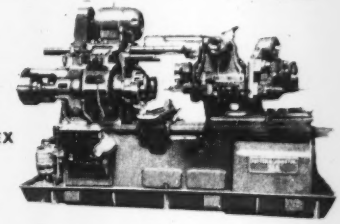
3U SPEED-FLEX



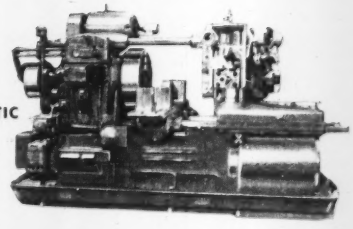
4D AUTOMATIC



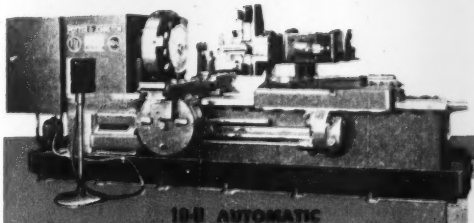
5D POWER-FLEX



5D-2 POWER-FLEX



6D AUTOMATIC



10-U AUTOMATIC

3U *SPEED-FLEX*

The Potter and Johnston 3U Speed-Flex is fast and fully automatic — the right machine to produce small, precision parts. Twenty-four spindle speeds from 73 to 1445 rpm with four automatic speed changes. For unusual versatility, front and rear cross slides can be operated simultaneously or independently with any of the six turret faces.

4D AUTOMATIC

Made in two sizes (standard and elevated) with spindle speeds up to 696 rpm — suitable for machining castings and forgings up to approximately 10 inches in diameter.

5D POWER-FLEX

Built in three sizes (standard, elevated and elevated with long travel) with spindle speeds to 610 rpm. Will handle work up to about 14 inches in diameter.

5D-2 POWER-FLEX

Two-spindle machines (built in two sizes) are capable of high production machining. Work diameters up to 7 inches and 13 inches respectively are accommodated.

6D AUTOMATIC

Available in three sizes and combinations of swings, travels and bed lengths. Will machine castings and forgings up to 18 in. in diameter and 20 in. long.

10-U AUTOMATIC

Designed for the rapid production of big work, the 10-U provides a 49 inch diameter swing over base ways, a 36 inch diameter swing over cross slides for chucking and a 27 inch diameter swing over cross slides for machining.

P & J Automatic Turret Lathes are accurate and rugged for lasting precision.

Literature, including complete specifications, for all P & J Automatics is available on request. Please specify model number.

WRITE DIRECT OR CONTACT YOUR NEAREST PRATT & WHITNEY BRANCH OFFICE . . .

BIRMINGHAM • BOSTON • CHICAGO
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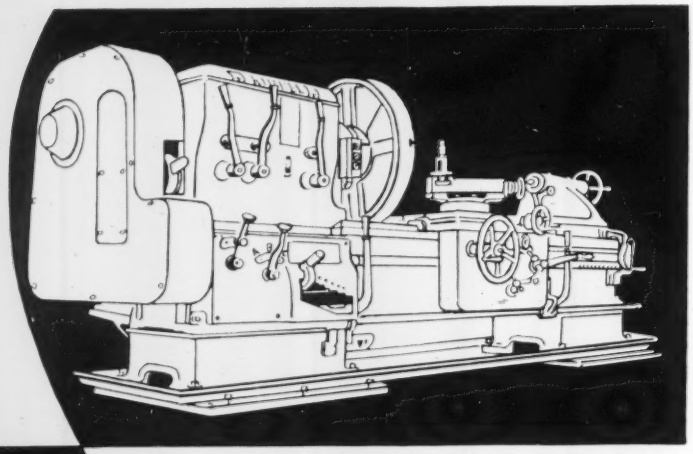
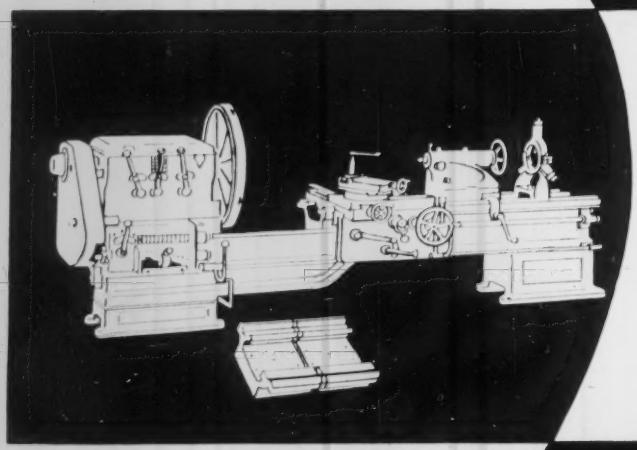
P&J

Heavy Duty Engine Lathes

Ruggedly constructed and carefully designed for extreme simplicity . . . a lathe combination that will cost you little to buy originally and little to maintain through years of trouble-free operation. 16", 18", 20", 25", 27", 32" and 36" swing sizes.



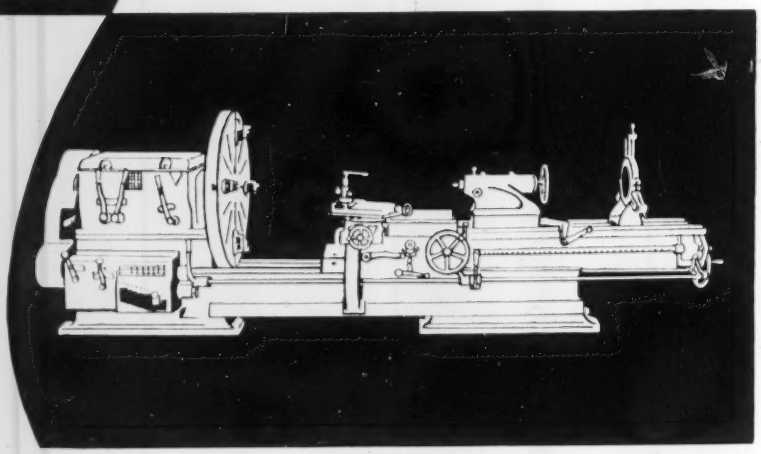


Removable Block Gap Lathes

These lathes have the increased swing capacity advantage of the Nebel Extension Bed Gap Lathes and at a considerable savings in initial investment. Removable block is furnished in two equal sections . . . thus providing gaps of two different lengths. Swing sizes 16"/27", 20"/30" and 25"/40".

Extension Bed Gap Lathes

With its double bed design, this machine offers the productive capacity of two ordinary lathes. Opening the upper bed not only increases the distance between centers but also the swing capacity. Two sizes: 20"/40" and 28"/50".



Nebel

WORKHORSE OF THE METAL WORKING SHOP SINCE 1899

THE NEBEL MACHINE TOOL CO.

3405 Central Parkway

CINCINNATI 25, OHIO

Take two looks at this map...

It's Your Guide to Monarch Sales and Monarch Service

How to *buy* a Monarch Lathe? Simple! Get in touch with your branch office or distributor (see map above). They'll give you our full story in type and pictures—show you a sound movie of the machines—arrange for job studies, if you wish—plan a field demonstration or a visit for a factory demonstration. If you're not sure which office to contact, write us and you'll find the right man on your doorstep—quick!

How to *get service* for your Monarch? It's just as easy—for the Monarch service plan is second to none in speed and efficiency. Resident factory-trained service engineers are strategically located around the country. Each man travels his territory constantly, demonstrating machines, instructing operators and following installations. He'll be in your plant in a hurry any time he's wanted. Just call your Monarch branch office or distributor.

We've been able to build this topflight sales and service organization only because of the great demand for the Monarch line of proved-in-performance lathes. Challenge us to improve your performance on any turning problem! . . . *The Monarch Machine Tool Company, Sidney, Ohio.*

Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

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CINCINNATI 37, OHIO
The Monarch Machine Tool Co., 7373 Brookcrest Drive, Roselawn Ctr. Bldg., Office C-17.

CLEVELAND 18, OHIO
The Monarch Machine Tool Co., 3091 Mayfield Road.

DETROIT 21, MICHIGAN. The Monarch Machine Tool Co., 16622 James Couzens Highway.

INDIANAPOLIS 5, INDIANA. The Monarch Machine Tool Co., Maco Building, Room 12, 709 East 38th St.

MONTCLAIR, NEW JERSEY. The Monarch Machine Tool Co., 484 Bloomfield Avenue.

PITTSBURGH 22, PENNSYLVANIA
The Monarch Machine Tool Co., 512 Empire Building, Liberty Ave. and Stanwix St.

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BOISE, IDAHO
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BUFFALO, NEW YORK. G. W. Brunton and Son, Inc., 2315 Elmwood Ave., Kenmore 17, New York.

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Wm. S. Bolden Co., Inc., 814 East Washington St.

CHATTANOOGA 1, TENNESSEE
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DALLAS 19, TEXAS
Greene Machinery Co., 6300 Wyche Blvd.

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C. H. Gosiger Machinery Co., Bacon & McDonough Sts.

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Bay Verte Machinery Company, 127-131 N. Pearl St.

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Moore Machinery Company, 3876 Santa Fe Avenue.

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SAN JOSE 13, CALIFORNIA
Moore Machinery Co., Porter Building.

SEATTLE 8, WASHINGTON
Hallidie Machinery Co., Inc., 210 Hudson St., South.

SHREVEPORT 93, LOUISIANA. Dixie Mill Supply Company of Shreveport, 200 Edwards Street.

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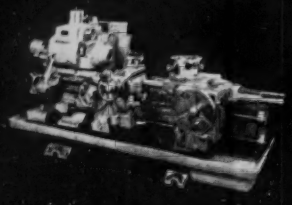
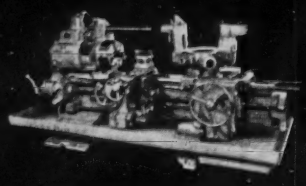
WEST HARTFORD 7, CONNECTICUT
O. C. Stevens Machinery Co., Inc., 76 LaSalle Road.

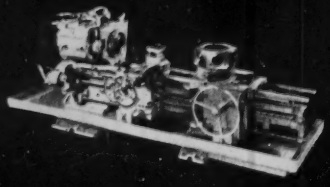
TURRET LATHES | **RAM TYPE ▸ ▾ SADDLE TYPE**



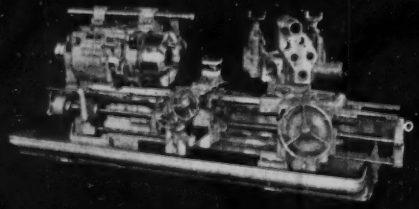
1-A UNIVERSAL HEAVY DUTY
2½" or 3" Bar Capacity—16¼" Swing



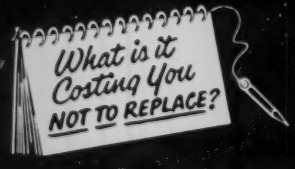
2-A UNIVERSAL HEAVY DUTY
3½" Bar Capacity—20" Swing

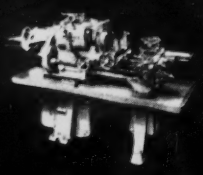


3-A UNIVERSAL HEAVY DUTY
4½" or 6" Bar Capacity—23½" Swing

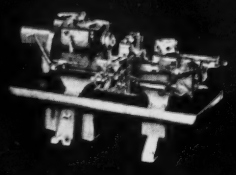


4-A UNIVERSAL HEAVY DUTY
8", 9" or 12" Bar Capacity—28¼" Swing





NO. 2 ALL-GEARED HEAD
1" Bar Capacity—14" Swing



NO. 3 UNIVERSAL
1½" Bar Capacity—15⅜" Swing

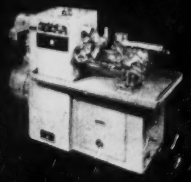
Get the competitive edge for the years ahead...

by planning a continuing modernization program

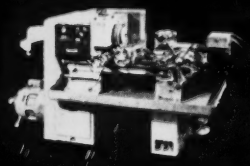
Look to the company that is constantly analyzing modern trends in metalworking to better fulfill the needs of industry by developing new types and sizes of machines — extending its Sales Engineering facilities to be of even greater service.

Look to your Warner & Swasey Field Engineer as your "turning specialist". He can help you select the right machine, and will continue to *share your interest* in its performance in the years ahead.

ELECTRO-CYCLES



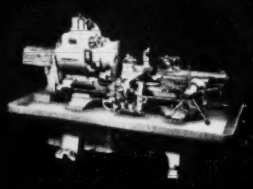
NO. 1 ELECTRO-CYCLE
⅝" Bar Capacity—11" Swing



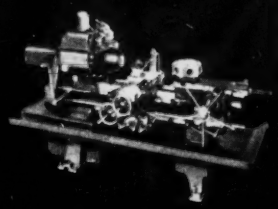
NO. 2 ELECTRO-CYCLE
1" Bar Capacity—14" Swing

YOU CAN TURN IT BETTER, FASTER, FOR LESS WITH WARNER

PRECISION TAPPING AND THREADING MACHINES

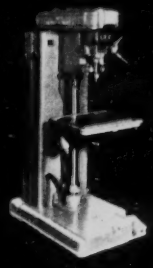


NO. 4 UNIVERSAL
2" Bar Capacity—18⅛" Swing

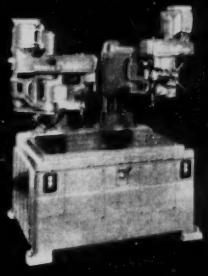


NO. 5 UNIVERSAL
2½" Bar Capacity—20" Swing

NO. 10 TAPPING MACHINE
0-80 to 10-24 Capacity

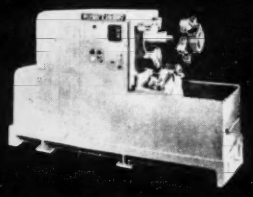


NO. 11 TAPPING MACHINE
8-36 to ⅞" Capacity

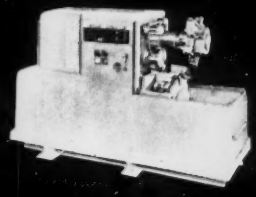


NO. 11 RS RADIAL (Single Head)
NO. 11 RD RADIAL (Double Head)
8-36 to ⅞" Capacity

SINGLE SPINDLE AUTOMATICS

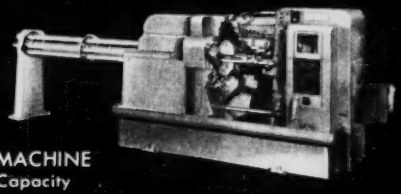


1 AC CHUCKING MACHINE
8" or 10" Chuck—6" Working Stroke

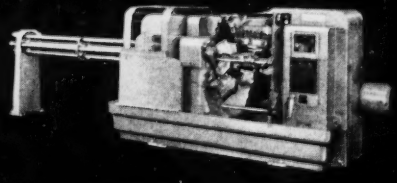


2 AC CHUCKING MACHINE
10" or 12" Chuck—9" Working Stroke

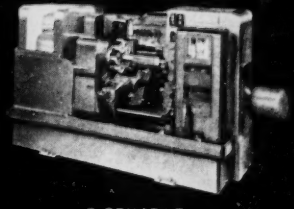
MULTI-SPINDLE AUTOMATICS



6-SPINDLE BAR MACHINE
¾" or 1¼" Bar Capacity

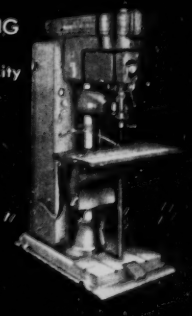


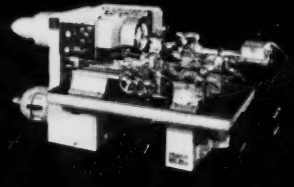
5-SPINDLE BAR MACHINE
1¾" Standard Bar Capacity
2¼" Oversize Capacity



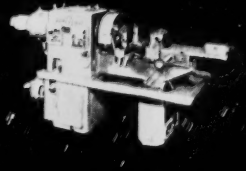
5-SPINDLE CHUCKING MACHINE
6" Swing

NO. 12 TAPPING MACHINE
⅜" to 2½" Capacity





NO. 3 ELECTRO-CYCLE
1½" Bar Capacity—15⅜" Swing



16" ELECTRO-CYCLE
1½" Bar Capacity—16⅞" Swing

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

& SWASEY TURRET LATHES, AUTOMATICS, TAPPING MACHINES

for wiring in action

only

SEALTITE

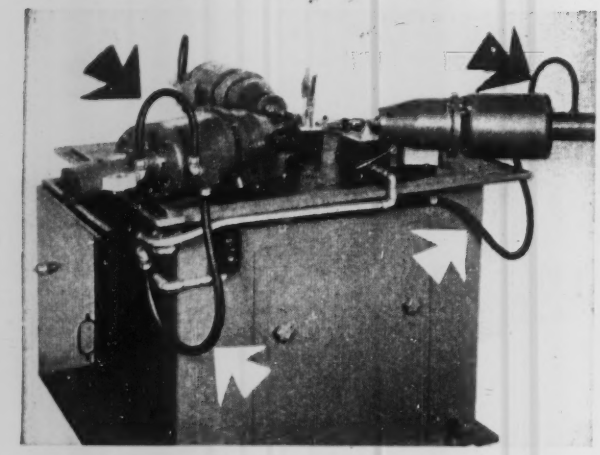
ELECTRICAL CONDUIT

is **flexible** as **rubber**

strong as **steel**

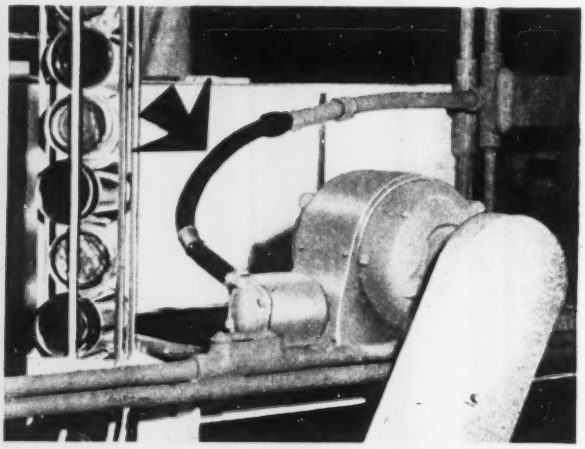
and **liquid-tight**

Flexible Sealtite can be used wherever there is vibration, where connections must move, or where installations are cramped and conduit must bend. Tough design problems become simple with Sealtite.



Here Sealtite protects wiring between the drill unit motors and control boxes on this Govro-Nelson Automatic Drilling Machine capable of drilling 1700 holes an hour.

Liquid-tight Sealtite's heavy synthetic jacket protects wiring from liquids, cutting oils, chemicals and steam. Though flexible, Sealtite's steel core guards wiring from crushing and impact.



Sealtite protects conveyor motor wiring at Van Camp Sea Food Co., Inc., Terminal Island, Cal., packers of famous "Chicken of the Sea" and "White Star" tuna. All mobile and cramped-space wiring is safe in Sealtite.

Sealtite* saves money. It can be installed in a fraction of the time it takes to install regular conduit. For temporary installations—such as on construction jobs and processing plants—Sealtite is quickly installed and easily relocated. For permanent installations—Sealtite improves appearance and avoids expensive rewiring. Sealtite can be cut as you need it. It comes in all standard electrical fitting sizes.

To find out how Sealtite can solve your need for a strong, flexible conduit, see your regular electrical supplier. Ask for Bulletin C-201 fully describing Sealtite or write for your copy directly to The American Brass Company, American Metal Hose Branch, Waterbury 20, Connecticut. In Canada: The Canadian Fairbanks-Morse Company Ltd.

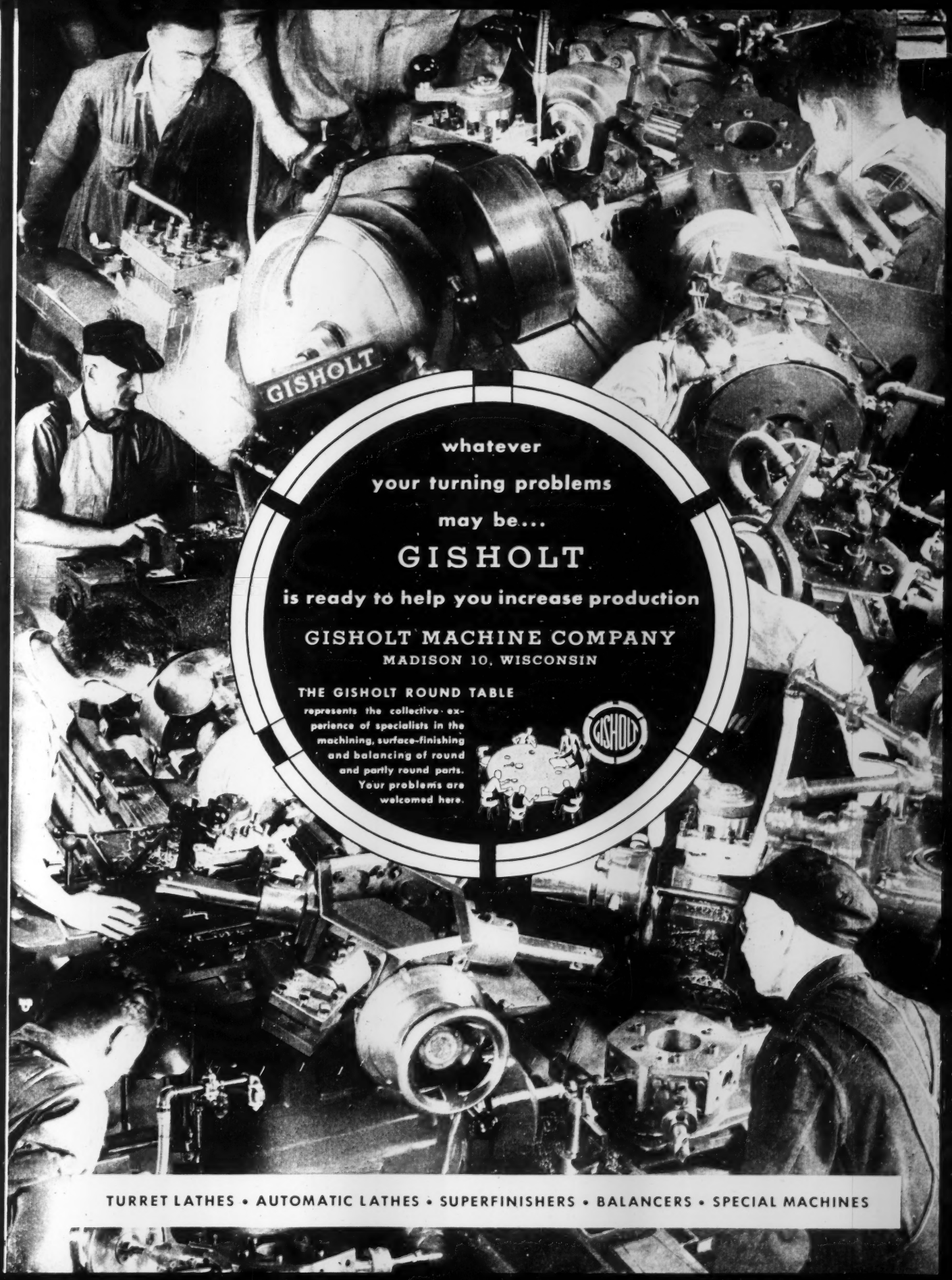
*Trademark

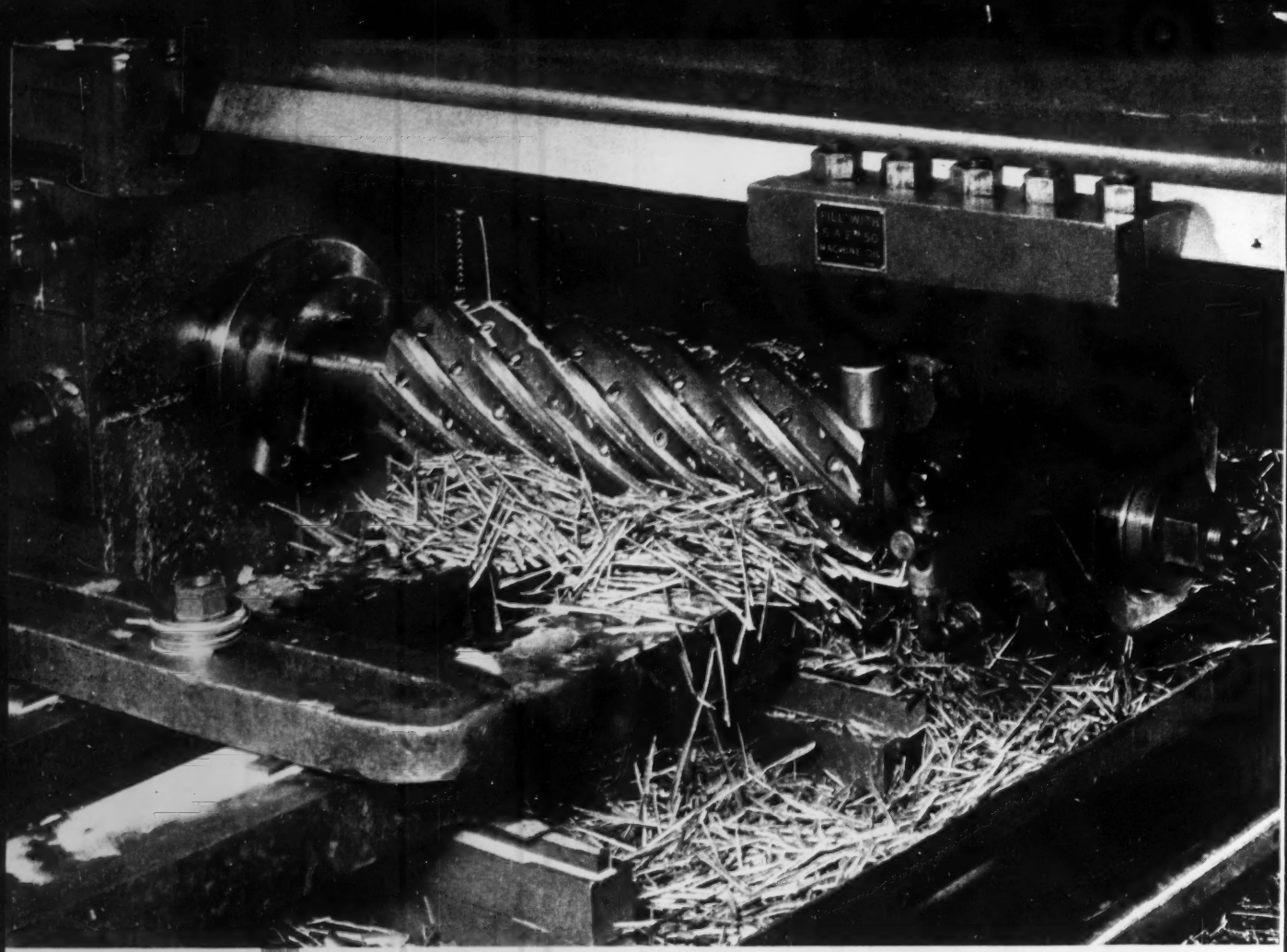
62237

for **flexible, liquid-tight** electrical conduit . . specify

SEALTITE

AN ANACONDA PRODUCT


GISHOLT
whatever
your turning problems
may be....
GISHOLT
is ready to help you increase production
GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN
THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.
GISHOLT
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



MANUFACTURERS IN THIS SECTION

Abrasive Machine Tool Co.—A2
Aircraft Machinery Corp.—A9
Atlas Press Co.—A21
Auto Engraver Co.—A22
The Baird Machine Co.—B1
W. F. & John Barnes Co.—B9
Benchmaster Mfg. Co.—B14
Bridgeport Machine Inc.—B41
Brown & Sharpe Mfg. Co.—B44
Burke Machine Tool Co.
Div. of U. S. Burke Machine Tool Co.—B54
Cincinnati Milling Machine Inc.—C12
Cochrane-Bly Co.—C30
Consolidated Machine Tool Corp.
Div. of Farrel-Birmingham Co.—C36
James Coulter Machine Co.—C41
Crowningshield-Harris Co.—C50
Davis & Thompson Co.—D5
F. W. Derbyshire Inc.—D7
Diamond Machine Tool Co.—D13
Ekstrom Carlson & Co.—E5
Elgin Tool Works—E9
Engineering & Research Corp.—E14
Ex-Cell-O Corp.—E19
Fitchburg Engineering Corp.—F7
Forneys Inc.—F12
Fray Machine Tool Co.—F18
Frew Machine Co.—F19
Giddings & Lewis Machine Tool Co.—G8
George Gorton Machine Co.—G14
G. A. Gray Co.—G20
Greaves Machine Tool Co.—G21
Hack Machine Co.—H1
Hall Planetary Co.—H3
Hanson-Whitney Machine Co.—H8
Hardinge Bros. Inc.—H9
Heald Machine Works—H14
Index Machine & Tool Co.—I3
Ingersoll Milling Machine Co.—I4
Jackson Machine & Tool Co.—J2
Kearney & Trecker Corp.—K4
Kempsmith Machine Co.—K6

SECTION 7

Milling Machines

Kent Owens Machine Co.—K9
Kling Brothers Engineering Works—K12
W. B. Knight Machinery Co.—K13
Lees-Bradner Co.—L13
Le Maire Tool & Mfg. Co.—L17
Midway Machine Co.—M23
Morey Machinery Co. Inc.—M34
Morton Mfg. Co.—M36
Motch & Merryweather Machinery Co.—M37
Murchey Div. of Sheffield Corp.—M39
New Hermes Inc.—N9
W. H. Nichols Co.—N11
Ohio Machine Tool Co.—O1
Onsrud Machine Works Inc.—O4
Plan-O-Mill Corp.—P10
Pratt &Whitney Div.
Niles-Bement-Pond Co.—P17
H. P. Preis Engraving Machine Co.—P18
Production Machinery Development Co.—P22
Producto Machine Co.—P23
Portland Machine Tool Works—P27
Reed-Prentice Corp.—R3
J. A. Richards Co.—R9
H. B. Rouse & Co.—R18
The Rowbottom Machine Co. Inc.—R19
Sheldon Machine Co.—S10
Shields Mfg. Co. Inc.—S11
Simplex Machine Tool Corp.—S17
Sloan & Chace Mfg. Co. Inc.—S20
Snyder Tool & Engineering Co.—S23
Standard Engineering Works—S31
Stark Tool Co.—S36
Sundstrand Machine Tool Co.—S43
Thurston Mfg. Co.—T10
Torrington Mfg. Co.—T13
H. P. Townsend Mfg. Co.—T14
Tree Tool & Die Works—T15
Turchan Follower Machine Co.—T18
U. S. Tool Co. Inc.—U6
Van Norman Co.—V2
Wade Tool Co.—W1
Waltham Machine Works—W7
Wickes Bros.—W19

MILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 821)

Bench Type and Hand Millers

Horizontal Plain Hand Feed

3½" stroke R18
12" x 1⅞", 6½" cc I17
3½" table travel R18
4" table travel F19
4¼" table travel, Lever Feed A21
5¼" table travel F19
6¼" x 21" table N11
7" table travel F19
8" table travel B54
8½" x 30" table N11
10" table travel S20
10" table travel S36
12" table travel, Bed Type A9
12" table travel A21
12" table travel E9
14" table travel I43
14½" table travel C50
16" table travel B54
21" table travel S31

Horizontal Plain Power Feed

8" table travel B54
9½" table travel A21
11" table travel H9
12" table travel, Bed Type A9
12" table travel B54
12" table travel S10
14½" table travel C50
16" table travel B54
21" table travel S31

Horizontal Universal Hand Feed

10" table travel S36

Horizontal Universal Power Feed

6" table travel B54
10" table travel B54
11½" table travel H9

Vertical Hand Feed

10" table travel, Bed Type A9
12" table travel E9
14½" table travel C50
27" table travel R3
28" table travel R3

Vertical Power Feed

14½" table travel C50

Knee Type

Horizontal Plain Power Feed

12" table travel, 10" width, Automatic C12
12½" table travel, Production B14
12½" table travel, Hand Screw B14
15" table travel K6
15" table travel, 10" width, Automatic C12
20" table travel H14
22" table travel K4
22" table travel K6
26" table travel, 40" length I3
28" table travel B44
28" table travel C12
28" table travel G14
28" table travel G21
28" table travel K4
28" table travel K6
28" table travel V2
32" table travel, 46" length I3
34" table travel B44
34" table travel C12
34" table travel G14
34" table travel G21
34" table travel K4
34" table travel V2
36" table travel K6
42" table travel C12
42" table travel K4
50" table travel C12
50" table travel K4

Horizontal Universal

22" table travel K4
22" table travel K6
28" table travel B44
28" table travel C12
28" table travel G14
28" table travel G21
28" table travel K4
28" table travel K6
28" table travel V2
32" table travel, 46" length I3
34" table travel B44
34" table travel, Omniversal B44
34" table travel C12
34" table travel G14
34" table travel G21
34" table travel K4
34" table travel V2
36" table travel K6
42" table travel C12
42" table travel K4
50" table travel C12
50" table travel K4

Vertical

12½" table travel, Hand Screw B14
12½" table travel, Production B14
16" table travel G14
16" table travel, 30" length I3
18" table travel, 9¾" width, Tool and Die C12
20" table travel, Adjustable Ram G14
20" table travel H14
20" table travel, 31" length I3
21" table travel J2
22" table travel K4
21" table travel, Adjustable Ram G14
24" table travel M23
26" table travel, 40" length I3
28" table travel B44
28" table travel C12
28" table travel K4
30" table travel S11
32" table travel, 46" length I3
34" table travel C12
34" table travel K4
34" table travel S11
42" table travel C12
42" table travel K4
50" table travel C12
50" table travel K4
60" table travel C12
60" table travel K4

Automatic & Manufacturing

10" dia. index work table P23
16" x 72" table, Horizontal Spindle O1
18" table travel, Horizontal K4
18" table travel, Vertical K4
20" dia. index work table P23
24" table travel, Horizontal K4
24" table travel, Vertical K4
28" table travel, Horizontal K4
28" table travel, Vertical K4
30" dia. index work table P23
31" table travel, Horizontal K4
31" table travel, Vertical K4
42" table travel, Horizontal K4
42" table travel, Vertical K4
50" table travel, Horizontal K4
50" table travel, Vertical K4
60" table travel, Horizontal K4
60" table travel, Vertical K4

Combination Miller-Shaper, Vertical

18" table travel C30

Ram Type

Plain Table

17" table travel V2
18" table travel V2
20" table travel B44
24" table travel B44
25" table travel, Vertical T15
28" table travel, Vertical E5
28" table travel V2
30" table travel B44
32" table travel B44
32" table travel V2
60" table travel, Vertical E5

Universal Table

16" table travel G14
18" table travel V2
20" table travel G14
22" table travel, Vertical & Horizontal F18
28" table travel V2
30" table travel H1
35" table travel V2
36" table travel H1
60" table travel H1

Bed Type

Plain Standard Horizontal Spindle

4" table travel, 5¼" width, Automatic C12
5" table travel, 6" width, Automatic I6
5½" head travel, 9" width K9
6" table travel, 6" width, Right and Left Hand I6
6" table travel B44
8" table travel, 6½" width, Automatic C12
8" table travel, 9" width K9
8" table travel, 9" width, Double Spindle K9
12" table travel, 9" width, Hand Feed K9
12" table travel, 9" width, Hand Feed, Double Spindle K9
12" table travel, 12" width A2
14" table travel, 9" width K9
14" table travel, 9" width, Double Spindle K9
18" table travel, 12" width, Automatic Cycle K4
20" table travel, 12" width K9
20" table travel, 12" width, Double Spindle K9
22" table travel, 9" width, Hand Feed K9
24 table travel, Electrically Controlled B14
24" table travel, 11" width, Automatic C12
24" table travel, 12" width, Automatic Cycle K4
24" table travel, 14" width, Hydromatic C12
24" table travel, 14" width, Tracer Controlled C12

MILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Bed Type

Plain Standard Horizontal Spindle

(Continued)

24" table travel, 18" width,
Automatic Cycle K4
30" table travel, 12" width,
Automatic Cycle K4
30" table travel, 18" width,
Automatic Cycle K4
36" table travel, 12" width,
Automatic Cycle K4
36" table travel, 14" width, Hydromatic . C12
36" table travel, 14" width, Tracer
Controlled, Hydromatic C12
36" table travel, 18" width, Hydromatic . C12
36" table travel, 18" width,
Tracer Controlled, Hydromatic C12
36" table travel, 18" width,
Automatic Cycle K4
40" travel, 18" x 60" table M37
40" travel, 24" x 60" table M37
42" table travel, 12" width,
Automatic Cycle K4
42" table travel, 18" width,
Automatic Cycle K4
48" table travel, 12" width,
Automatic Cycle K4
48" table travel, 18" width, Hydromatic . C12
48" table travel, 18" width,
Tracer Controlled, Hydromatic C12
48" table travel, 18" width,
Automatic Cycle K4
48" table travel, 22" width, Hydromatic . C12
48" table travel, 22" width,
Tracer Controlled, Hydromatic C12
48" table travel, 24" width,
Automatic Cycle K4
54" table travel, 18" width,
Automatic Cycle K4
56" travel, 18" x 84" table M37
56" travel, 24" x 84" table M37
60 table travel, 22" width,
Tracer Controlled, Hydromatic C12
60" table travel, 22" width, Hydromatic . C12
72" table travel, 18" width,
Automatic Cycle K4
72" table travel, 24" width,
Automatic Cycle K4
72" travel, 24" x 110" table M37
72" table travel, 26" width,
Tracer Controlled, Hydromatic C12
72" table travel, 26" width, Hydromatic . C12
72" table travel, 32" width,
Automatic Cycle K4
72" table travel, 36" width, Hydro-Tel. . C12
90" table travel, 26" width, Hydromatic . C12
96" table travel, 18" width,
Automatic Cycle K4
96" table travel, 24" width,
Automatic Cycle K4
96" table travel, 32" width,
Automatic Cycle K4
96" table travel, 42" width,
Automatic Cycle K4
120" table travel, 18" width,
Automatic Cycle K4
120" table travel, 24" width,
Automatic Cycle K4
120" table travel, 32" width,
Automatic Cycle K4
120" table travel, 36" width, Hydro-Tel. . C12
120" table travel, 42" width,
Automatic Cycle K4
144" table travel, 18" width,
Automatic Cycle K4
144" table travel, 24" width,
Automatic Cycle K4
144" table travel, 21" width,
Automatic Cycle K4
144" table travel, 32" width,
Automatic Cycle K4
144" table travel, 42" width,
Automatic Cycle K4
15 hp max. cap., Dual Head, Automatic,
Reciprocating Table M37
30 hp max. cap., Dual Head, Automatic,
Reciprocating Table M37
75 hp max. cap., Dual Head, Automatic,
Reciprocating Table M37
125 hp max. cap., Dual Head, Automatic,
Reciprocating Table M37
Special F7

Plain Rise & Fall Horizontal Spindle

8" table travel, 6½" width C12
24" table travel, 11" width C12
Special C36
Special F7

Duplex Standard Horizontal Spindle

Rise and Fall, 4 spindle D5
6" table travel, 6" width U6
8½ x 27" table N11
24" table travel, 8¾" width S13
24" table travel, 11" width
Automatic Rise and Fall C12
24" table travel, 11" width, Automatic . C12
24" table travel, 12" width S13
24" table travel, 14" width C12
24" table travel, 14" width
Tracer Controled, Hydromatic C12
36" table travel, 12" width S13
36" table travel, 14" width, Hydromatic . C12
36" table travel, 14" width
Tracer Controled, Hydromatic C12
36" table travel, 18" width, Hydromatic . C12
36" table travel, 18" width
Tracer Controled, Hydromatic C12
40" travel, 18" x 60" table M37
40" travel, 24" x 60" table M37
48" table travel, 12" width S13
48" table travel, 14" width S13
48" table travel, 18" width,
Tracer Controled, Hydromatic C12
48" table travel, 18" width, Hydromatic . C12
48" table travel, 18" width S13
48" table travel, 22" width, Hydromatic . C12
48" table travel, 22" width
Tracer Controled, Hydromatic C12
48" table travel, 24" width S13
56" travel, 18" x 84" table M37
56" travel, 24" x 84" table M37
60" table travel, 22" width
Tracer Controled, Hydromatic C12
60" table travel, 22" width, Hydromatic . C12
60" table travel, Nonferrous O1
72" table travel, 14" width S13
72" travel, 18" x 110" table M37
72" table travel, 18" width S13
72" travel, 24" x 110" table M37
72" table travel, 24" width S13
72" table travel, 26" width
Tracer Controled, Hydromatic C12
90" table travel, 26" width, Hydromatic . C12
90" table travel, 26" width
Tracer Controled, Hydromatic C12
96" table travel, 18" width S13
96" table travel, 24" width S13
96" table travel, 30" width S13
120" table travel, 18" width S13
120" table travel, 24" width S13
120" table travel, 30" width S13
144" table travel, 24" width, ... S13
144" table travel, 36" width S13
168" table travel, 24" width S13
168" table travel, 36" width S13
Special F7

Vertical Spindle Standard

3" table travel, 10" dia.
Rotary Table with power Feed C12
5" table travel, 6" width U6
8" table travel, 6" width
Rotary Table with Power Feed C12
20" table travel, 12" width K9
27" table travel
Milling Machine and Die Sinker R3
28" vertical travel, 40" longitudinal swivel,
Swivel Head P27
30" table travel, 16" width, Hydro-Tel. . C12
48" table travel R3
60" table travel, 28" width, Hydro-Tel. . C12
96" table travel, 28" width, Hydro-Tel. . C12
96" table travel, 36" width, Hydro-Tel. . C12
120" table travel, 28" width, Hydro-Tel. . C12
120" table travel, 28" width P27
120" table travel, 36" width, Hydro-Tel. . C12
144" table travel, 36" width, Hydro-Tel. . C12
168" table travel, 36" width, Hydro-Tel. . C12
192" table travel, 36" width, Hydro-Tel. . C12
216" table travel, 36" width, Hydro-Tel. . C12
240" table travel, 36" width, Hydro-Tel. . C12
15 hp max. cap., Traveling Head,
Single or Dual M37
30 hp max. cap., Traveling Head,
Single or Dual M37
75 hp max. cap., Traveling Head,
Single or Dual M37
125 hp max. cap., Traveling Head,
Single or Dual M37

Bridge Type, Fixed Height Rail

Special, Straddle Millers F7
Special I1

Adjustable Rail Type, Not Including Planer Type

Special I1

Multiple Spindle

12" table travel, 14" width, 360° Profiler
Four Spindle, Automatic C12
30" table travel H1
Special, Horizontal and Vertical B9

Triplex

48" table travel, 18" width table K4
48" table travel, 24" width table K4
72" table travel, 18" width table K4
72" table travel, 24" width table K4
72" table travel, 32" width table K4
96" table travel, 18" width table K4
96" table travel, 24" width table K4
96" table travel, 32" width table K4
96" table travel, 42" width table K4
120" table travel, 18" width table K4
120" table travel, 24" width table K4
120" table travel, 32" width table K4
120" table travel, 42" width table K4
144" table travel, 18" width table K4
144" table travel, 24" width table K4
144" table travel, 32" width table K4
144" table travel, 42" width table K4
168" table travel, 24" width S13

Planer Type

Double Housing

4' table travel, 24" width P22
6' table travel, 24" width S17
6' table travel, 30" width S17
6' table travel, 36" width S17
6' table travel, 42" width S17
6' table travel, 48" width S17
8' table travel, 24" width S17
8' table travel, plus any additional
length in 2' increments,
30" width, 7½" quill dia. G8
8' table travel, plus any additional
length in 2' increments,
30" width, 8¾" quill dia. G8
8' table travel, 30" width S17
8' table travel, plus any additional
length in 2' increments,
36" width, 7½" quill dia. G8
8' table travel, plus any additional
length in 2' increments,
36" width, 8¾" quill dia. G8
8' table travel, 36" width G20
8' table travel, 36" width S17
8' table travel, plus any additional
length in 2' increments,
42" width, 7½" quill dia. G8
8' table travel, plus any additional
length in 2' increments,
42" width, 8¾" quill dia. G8
8' table travel, 42" width G20
8' table travel, 42" width S17
8' table travel, 48" width G20
8' table travel, 48" width S17
8' table travel, 66" width G20
10' table travel, 24" width S17
10' table travel, 30" width S17
10' table travel, 36" width G20
10' table travel, 36" width S17
10' table travel, 42" width G20
10' table travel, 42" width S17
10' table travel, plus any additional
length in 2' increments,
48" width, 7½" quill dia. G8
10' table travel, plus any additional
length in 2' increments,
48" width, 8¾" quill dia. G8

MILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Planer Type

Double Housing

(Continued)

10' table travel, plus any additional length in 2' increments, 48" width, 10" quill dia. G8
10' table travel, plus any additional length in 2' increments, 48" width, 12" quill dia. G8
10' table travel, plus any additional length in 2' increments, 48" width, 14" quill dia. G8
10' table travel, 48" width G20
10' table travel, 48" width S17
10' table travel plus any additional length in 2' increments, 54" width, 7½" quill dia. G8
10' table travel plus any additional length in 2' increments, 54" width, 8¾" quill dia. G8
10' table travel plus any additional length in 2' increments, 54" width, 10" quill dia. G8
10' table travel plus any additional length in 2' increments, 54" width, 12" quill dia. G8
10' table travel plus any additional length in 2' increments, 54" width, 14" quill dia. G8
10' table travel plus any additional length in 2' increments, 60" width, 7½" quill dia. G8
10' table travel plus any additional length in 2' increments, 60" width, 8¾" quill dia. G8
10' table travel plus any additional length in 2' increments, 60" width, 10" quill dia. G8
10' table travel plus any additional length in 2' increments, 60" width, 12" quill dia. G8
10' table travel plus any additional length in 2' increments, 60" width, 14" quill dia. G8
10' table travel plus any additional length in 2' increments, 66" width, 7½" quill dia. G8
10' table travel plus any additional length in 2' increments, 66" width, 8¾" quill dia. G8
10' table travel plus any additional length in 2' increments, 66" width, 10" quill dia. G8
10' table travel plus any additional length in 2' increments, 66" width, 12" quill dia. G8
10' table travel plus any additional length in 2' increments, 66" width, 14" quill dia. G8
10' table travel, 66" width G20
10' table travel plus any additional length in 2' increments, 72" width, 7½" quill dia. G8
10' table travel plus any additional length in 2' increments, 72" width, 8¾" quill dia. G8
10' table travel plus any additional length in 2' increments, 72" width, 10" quill dia. G8
10' table travel plus any additional length in 2' increments, 72" width, 12" quill dia. G8
10' table travel plus any additional length in 2' increments, 72" width, 14" quill dia. G8
10' table travel plus any additional length in 2' increments, 78" width, 8¾" quill dia. G8
10' table travel plus any additional length in 2' increments, 78" width, 10" quill dia. G8
10' table travel plus any additional length in 2' increments, 78" width, 12" quill dia. G8
10' table travel plus any additional length in 2' increments, 78" width, 14" quill dia. G8
10' table travel, 78" width G20
10' table travel, 84" width G20
10' table travel, 108" width G20
12' table travel, 24" width S17
12' table travel, 30" width S17
12' table travel, 36" width G20
12' table travel, 36" width S17
12' table travel, 42" width G20
12' table travel, 42" width S17
12' table travel, 48" width G20
12' table travel, 48" width S17
12' table travel, 66" width G20
12' table travel, 78" width G20
12' table travel plus any additional length in 2' increments, 84" width, 8¾" quill dia. G8
12' table travel plus any additional length in 2' increments, 84" width, 10" quill dia. G8
12' table travel plus any additional length in 2' increments, 84" width, 12" quill dia. G8
12' table travel plus any additional length in 2' increments, 84" width, 14" quill dia. G8
12' table travel, 84" width G20
12' table travel plus any additional length in 2' increments, 96" width, 8¾" quill dia. G8
12' table travel plus any additional length in 2' increments, 96" width, 10" quill dia. G8
12' table travel plus any additional length in 2' increments, 96" width, 12" quill dia. G8
12' table travel plus any additional length in 2' increments, 96" width, 14" quill dia. G8
12' table travel plus any additional length in 2' increments, 108" width, 8¾" quill dia. G8
12' table travel plus any additional length in 2' increments, 108" width, 10" quill dia. G8
12' table travel plus any additional length in 2' increments, 108" width, 12" quill dia. G8
12' table travel plus any additional length in 2' increments, 108" width, 14" quill dia. G8
12' table travel, 108" width G20
12' table travel plus any additional length in 2' increments, 120" width, 8¾" quill dia. G8
12' table travel plus any additional length in 2' increments, 120" width, 10" quill dia. G8
12' table travel plus any additional length in 2' increments, 120" width, 12" quill dia. G8
12' table travel plus any additional length in 2' increments, 120" width, 14" quill dia. G8
12' table travel plus any additional length in 2' increments, 144" width, 8¾" quill dia. G8
12' table travel plus any additional length in 2' increments, 144" width, 10" quill dia. G8
12' table travel plus any additional length in 2' increments, 144" width, 12" quill dia. G8
12' table travel plus any additional length in 2' increments, 144" width, 14" quill dia. G8
14' table travel, 24" width S17
14' table travel, 30" width S17
14' table travel, 36" width G20
14' table travel, 36" width S17
14' table travel, 42" width G20
14' table travel, 42" width S17
14' table travel, 48" width G20
14' table travel, 48" width S17
14' table travel, 66" width G20
14' table travel, 78" width G20
14' table travel, 84" width G20
14' table travel, 108" width G20
16' table travel, 24" width S17
16' table travel, 30" width S17
16' table travel, 36" width G20
16' table travel, 36" width S17
16' table travel, 42" width G20
16' table travel, 42" width S17
16' table travel, 48" width G20
16' table travel, 48" width S17
16' table travel, 66" width G20
16' table travel, 78" width G20
16' table travel, 84" width G20
16' table travel, 108" width G20
18' table travel, 36" width G20
18' table travel, 42" width G20
18' table travel, 48" width G20
18' table travel, 66" width G20
18' table travel, 78" width G20
18' table travel, 84" width G20
18' table travel, 108" width G20
20' table travel, 36" width G20
20' table travel, 42" width G20
20' table travel, 48" width G20
20' table travel, 66" width G20
20' table travel, 78" width G20
20' table travel, 84" width G20
20' table travel, 108" width G20
22' table travel, 36" width G20
22' table travel, 42" width G20
22' table travel, 48" width G20
22' table travel, 66" width G20
22' table travel, 78" width G20
22' table travel, 84" width G20
22' table travel, 108" width G20
24' table travel, 36" width G20
24' table travel, 42" width G20
24' table travel, 48" width G20
24' table travel, 66" width G20
24' table travel, 78" width G20
24' table travel, 84" width G20
24' table travel, 108" width G20
26' table travel, 42" width G20
26' table travel, 48" width G20
26' table travel, 66" width G20
26' table travel, 78" width G20
26' table travel, 84" width G20
26' table travel, 108" width G20
28' table travel, 42" width G20
28' table travel, 48" width G20
28' table travel, 66" width G20
28' table travel, 78" width G20
28' table travel, 84" width G20
28' table travel, 108" width G20
30' table travel, 42" width G20
30' table travel, 48" width G20
30' table travel, 66" width G20
30' table travel, 78" width G20
30' table travel, 84" width G20
30' table travel, 108" width G20
32' table travel, 48" width G20
32' table travel, 66" width G20
32' table travel, 78" width G20
32' table travel, 84" width G20
32' table travel, 108" width G20
34' table travel, 48" width G20
34' table travel, 66" width G20
36' table travel, 48" width G20
36' table travel, 66" width G20
36' table travel, 78" width G20
36' table travel, 84" width G20
36' table travel, 108" width G20
38' table travel, 66" width G20
40' table travel, 78" width G20
40' table travel, 84" width G20
40' table travel, 108" width G20
Special C36
Special I4
Special, Slab Milling C36

Openside

36" length, 30" width F7
8' table travel, 36" width G20
8' table travel, 42" width G20
8' table travel, 48" width G20
8' table travel, 60" width G20
10' table travel, 36" width G20
10' table travel, 42" width G20
10' table travel, 48" width G20
10' table travel, 54" width D5
10' table travel, 60" width G20
10' table travel, 72" width G20

(Code number following each listing indicates manufacturer, key on page 82)

Planer Type

Openside

(Continued)

10' table travel, 84" width G20
12' table travel, 36" width G20
12' table travel, 42" width G20
12' table travel, 48" width G20
12' table travel, 60" width G20
12' table travel, 72" width G20
12' table travel, 84" width G20
14' table travel, 36" width G20
14' table travel, 42" width G20
14' table travel, 48" width D5
14' table travel, 48" width G20
14' table travel, 60" width G20
14' table travel, 72" width G20
14' table travel, 84" width G20
16' table travel, 36" width G20
16' table travel, 42" width G20
16' table travel, 48" width G20
16' table travel, 60" width G20
16' table travel, 72" width G20
16' table travel, 84" width G20
18' table travel, 36" width G20
18' table travel, 42" width G20
18' table travel, 48" width G20
18' table travel, 60" width G20
18' table travel, 72" width G20
18' table travel, 84" width G20
20' table travel, 36" width G20
20' table travel, 42" width G20
20' table travel, 48" width G20
20' table travel, 60" width G20
20' table travel, 72" width G20
20' table travel, 84" width G20
22' table travel, 36" width G20
22' table travel, 42" width G20
22' table travel, 48" width G20
22' table travel, 60" width G20
22' table travel, 72" width G20
22' table travel, 84" width G20
24' table travel, 36" width G20
24' table travel, 42" width G20
24' table travel, 48" width G20
24' table travel, 60" width G20
24' table travel, 72" width G20
24' table travel, 84" width G20
26' table travel, 42" width G20
26' table travel, 48" width G20
26' table travel, 60" width G20
26' table travel, 72" width G20
26' table travel, 84" width G20
28' table travel, 42" width G20
28' table travel, 48" width G20
28' table travel, 60" width G20
28' table travel, 72" width G20
28' table travel, 84" width G20
30' table travel, 42" width G20
30' table travel, 48" width G20
30' table travel, 60" width G20
30' table travel, 72" width G20
30' table travel, 84" width G20
32' table travel, 48" width G20
32' table travel, 60" width G20
32' table travel, 72" width G20
32' table travel, 84" width G20
34' table travel, 48" width G20
34' table travel, 60" width G20
36' table travel, 48" width G20
36' table travel, 60" width G20
36' table travel, 72" width G20
36' table travel, 84" width G20
38' table travel, 60" width G20
40' table travel, 72" width G20
40' table travel, 84" width G20
Special I4
Wing Span, Nonferrous O4

Combination Miller & Planer, Double Housing

10' table travel, 48" width G20
10' table travel, 72" width G20
12' table travel, 48" width G20
12' table travel, 72" width G20
14' table travel, 48" width G20
14' table travel, 72" width G20
16' table travel, 48" width G20
16' table travel, 72" width G20
18' table travel, 48" width G20
18' table travel, 72" width G20
20' table travel, 48" width G20
20' table travel, 72" width G20
22' table travel, 48" width G20
22' table travel, 72" width G20
24' table travel, 48" width G20
24' table travel, 72" width G20
26' table travel, 48" width G20
26' table travel, 72" width G20
28' table travel, 72" width G20
30' table travel, 48" width G20
30' table travel, 72" width G20
32' table travel, 48" width G20
32' table travel, 72" width G20
36' table travel, 48" width G20
36' table travel, 72" width G20
40' table travel, 48" width G20
40' table travel, 72" width G20
Special C36

Combination Miller & Plainer, Openside

10' table travel, 48" width G20
10' table travel, 72" width G20
10' table travel, 108" width G20
12' table travel, 48" width G20
12' table travel, 72" width G20
12' table travel, 108" width G20
14' table travel, 48" width G20
14' table travel, 72" width G20
14' table travel, 108" width G20
16' table travel, 48" width G20
16' table travel, 72" width G20
16' table travel, 108" width G20
18' table travel, 48" width G20
18' table travel, 72" width G20
18' table travel, 108" width G20
20' table travel, 48" width G20
20' table travel, 72" width G20
20' table travel, 108" width G20
22' table travel, 48" width G20
22' table travel, 72" width G20
22' table travel, 108" width G20
24' table travel, 48" width G20
24' table travel, 72" width G20
24' table travel, 108" width G20
26' table travel, 48" width G20
26' table travel, 72" width G20
26' table travel, 108" width G20
28' table travel, 48" width G20
28' table travel, 72" width G20
28' table travel, 108" width G20
30' table travel, 48" width G20
30' table travel, 72" width G20
30' table travel, 108" width G20
32' table travel, 48" width G20
32' table travel, 72" width G20
32' table travel, 108" width G20
36' table travel, 48" width G20
36' table travel, 72" width G20
36' table travel, 108" width G20
40' table travel, 48" width G20
40' table travel, 72" width G20
40' table travel, 108" width G20

Profiling Machines and Duplicators, Including Engravers

10" x 10" Mold Capacity, Duplicating, Bottle Molds, 4 spindle P17
13" x 10" Mold Capacity, Duplicating, Bottle Molds, 2 spindle P17
10⅞" table travel, Duplicator, Universal Head G14
10⅞" table travel, Duplicator, Swivel Head G14
10⅞" table travel, Duplicator, Vertical Head G14
99" blade, Aircraft Propellers E14
12" x 15½" table, Vertical F19
12" x 15½" table, Vertical, 2 spindle F19
12" x 10" x 5" Die Capacity, Duplicating, Forging Dies, 2 spindle P17
12" x 10" x 5" Die Capacity, Duplicating, Forging Dies, 4 spindle P17
12" table travel, Duplicator, Vertical, Manual G14
14" x 7" engraving area, Bench Type N9
15" table travel, Duplicator, Vertical, Manual G14
15" x 24" table, Vertical F19
15" x 24" table, vertical, 2 spindle F19
16" x 27" x 12" Die Capacity, Duplicating, Forging Dies P17
20" x 22" Travel, Vertical P17
20" x 24" table, Vertical F19
20" x 24" table, Vertical, 2 spindle F19
20" x 27" Travel, Vertical P17
23" table travel, 2 spindle M31
24" x 16" Travel P17
24" x 36" table, Vertical F19
24" x 36" table, Vertical, 2 spindle F19
31" dia. table, Vertical, Rotary Table D5
31" dia. table, 9 spindle, Vertical, Rotary Table D5
36" table travel, 2 spindle M31
36" x 16" travel P17
36" x 20" travel P17
36" x 41" travel, Vertical P17
36" x 51" travel, Vertical P17
48" table travel M31
48" x 21" travel P17
48" x 30" travel P17
60" x 21" travel P17
60" x 30" travel P17
72" table travel M31
72" x 31" travel P17
72" x 48" travel P17
96" table travel M31
96" x 31" travel P17
96" x 48" travel P17
120" table travel M31
120" x 31" travel P17
120" x 33" travel P17
120" x 48" travel P17
120" x 60" travel P17
120" x 72" travel P17
120" x 84" travel P17
144" table travel M31
144" x 33" travel P17
144" x 60" travel P17
144" x 72" travel P17
144" x 84" travel P17
168" x 33" travel P17
168" x 60" travel P17
168" x 72" travel P17
168" x 84" travel P17
192" x 33" travel P17
192" x 84" travel P17
240" x 33" travel P17
240" x 84" travel P17
1¼" x 4", Engraving & Profiling, Pantograph, Bench Model, 2 dim. A22
2" x 4" horiz. work area, Precision Bench W1
2" x 5", Engraving & Profiling, Pantograph, Bench Model, 2 dim. A22

MILLING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Profiling Machines and Duplicators, Including Engravers

(Continued)

3" x 8½", 3½" max. dia. cutter, Horizontal ... E19
5" x 9", Engraving & Profiling, Pantograph, Bench Model, 2 dim ... A22
6" x 18", 4" max. dia. cutter, Horizontal ... E19
8" x 16", Engraving, Profiling and Milling, Pantograph, Heavy Bench Model, 2 and 3 dim ... A22
Profile Machine, Vertical ... S23
1:1 to 6:1 reduction, Engraving Machine, Two Dimensional Pantograph ... G14
1:1 to 16:1 reduction, Engraving Machine, Two Dimensional Pantograph ... G14
1:1 to 10:1 reduction, Engraving Machine, Two dim. optical comparator ... G14
2:1 to 8:1 reduction, Engraving Machine, Three Dimensional Pantograph ... G14
2:1 to 40:1 reduction, Engraving Machine, Three Dimensional Pantograph ... G14
3:1 to 9:9 reduction, Engraving Machine, Two dim. optical Pantograph ... G14
30" dia., 12" long, Engraving Machine, Roll Pantograph ... G14
6" vertical travel, Duplicating, Jet Blades, 8° spindle ... P17
7" dia. dials, Graduating Machine ... G14
Two Dimensional, Bench ... P18
Two Dimensional, Bench or Floor ... P18
Variable ratios, Adjustable ... P18
2 to 1 ratio only, Stationary ... P18
Three Dimensional, horizontal duplicator, 10" to 10" horizontal travel, 4" vertical travel ... P27
15" dia. table, Rotary Table, Vertical Nonferrous ... O1
27" x 80" x 75" table, Vertical, Nonferrous ... O1
Special, Profile Milling ... C36
Special ... F7

Die Sinking Machines

Plain

1⅝" thickness & 6½" width of dies ... T10
12" x 36" table, 12" x 18" table travel ... P17
15" x 40" table, 12" x 18" table travel ... P17

Universal

12" x 36" table, 12" x 18" table travel ... P17
15" x 40" table, 12" x 18" table travel ... P17
18" travel ... K1
24" travel, 36" x 16" table ... K1
Special ... T18

Thread Milling Machines

External Only

3" dia., 10" cc ... W7
4½" dia., 12" cc ... P17
4½" dia., 36" cc ... P17
6" dia., 20" cc ... P17
6" dia., 60" cc ... P17
6" dia., 96" cc ... P17
6" dia., 120" cc ... P17

Universal, Not Including Automatic

4" dia. thread, 9" spindle, Semi-Automatic ... H8
8" dia. thread, 16" spindle, Semi-Automatic ... H8
10" dia. thread, 24" spindle, Semi-Automatic ... H8
10" dia., 24" cc ... C41
10" dia., 42" cc ... C41
10" dia., 60" cc ... C41
12" dia., 24" cc ... C41
12" dia., 24" cc ... L13
12" dia., 42" cc ... C41
12" dia., 54" cc ... L13
12" dia., 60" cc ... C41
12" dia., 72" cc ... L13
12" dia., 102" cc ... L13
12" dia., 144" cc ... L13

Universal Automatic

7" dia., 20" cc, Hob Thread ... C41
8" dia., 12" cc ... L13

Chucking Automatic

6⅝" hole thru spindle ... W19
18½" max. Hi spindle ... W19
18½" max. Hi spindle ... W19

Planetary

2" dia., int. or ext. ... P10
6" over ways, Horizontal ... H3
6" over ways, 2 spindle, Horizontal ... H3
8" dia., int. or ext. ... P10
8" over ways, 2 spindle, Horizontal ... H3
9½" over ways, Horizontal ... H3
9½" over ways, 2 spindle, Horizontal ... H3
9½" over ways, 6 spindle, Vertical ... H3
9½" over ways, 6 spindle, Vertical ... H3
12" diameter ... M39
13½" over ways, 2 spindle, Horizontal ... H3
13½" over ways, Horizontal ... H3
20" dia., int. or ext. ... P10

Milling Machines Not Elsewhere Classified

Spline Millers

1" long, ⅛" wide, Horizontal, 4 Heads ... E19
4" stroke, ½ cutter, Duplex Spindle ... T14

Routers

12" wide, 24" long ... T18
26" x 40" over-all, 1 hp, Radial Arm ... R9
36½" x 44" x 52½" over-all, Straight Line ... R9
57" x 48" x 80" over-all, Radial Arm ... R9
58" x 40" x 24", Radial Arm ... R9
58" x 44" x 32" over-all, Semi-Curved Plate ... R9
84" swing, Manually operated radial arm routers ... E5
84" swing, Power operated radial arm routers, two-section arm type ... E5
100" swing, Manually operated radial arm routers ... E5
121" swing, Power operated radial arm routers, two-section arm type ... E5
30" table travel, Drilling & Milling Mach., universal routing ... E5
¼ hp motor, Pedestal Model ... R9

Spar Millers

18" travel, 12" width table, Automatic Cycle ... K4
24" travel, 12" width table, Automatic Cycle ... K4
24" travel, 18" width table, Automatic Cycle ... K4
30" travel, 12" width table, Automatic Cycle ... K4
36" travel, 12" width table, Automatic Cycle ... K4
36" travel, 18" width table, Automatic Cycle ... K4
42" travel, 12" width table, Automatic Cycle ... K4
42" travel, 18" width table, Automatic Cycle ... K4
48" travel, 12" width table, Automatic Cycle ... K4
48" travel, 18" width table, Automatic Cycle ... K4
54" travel, 18" width table, Automatic Cycle ... K4

Drum Type Millers

1 spindle, Continuous, Horiz ... D5
1 spindle, Horizontal ... D5
1 spindle, Rotary Drum, Horiz ... D5
Special ... C36

Cam Millers

11" dia. ... R19
32" dia., 12" travel ... R19
Special ... B1

Traveling Housing Type Not Including Profiling & Duplicators

Special ... H

Others

18" table travel, Knee Type Rotary Head ... K4
23" x 10" table travel, Vertical ... K13
23" x 12" table travel, Vertical ... K13
28" x 11" table travel, Vertical ... K13
70" dia. blade, Dressing Machine Saw Blade, Friction ... K12
144" min. long travel, Scarf Milling Machine, horizontal spindle ... E5
20" table cap., Cavity Type Milling Machine ... E5
1 spindle ... S23
3 spindle ... S23
4 way ... S23
4 station ... S23
Feed Rolls for Continuous Work ... T13
Special, Automatic Cycle Milling ... T18
Special, Milling & Centering ... F7
Special, Comb. Milling & Boring ... F7
Special, Comb. Milling & Drilling ... F7
Special, Slab Millers ... F7
Special, Crankshaft Millers ... F7
Special, Radius Millers ... F7
Special, Rotary Millers ... F7
Special, Climb Millers ... F7
Special, Girt Millers ... F7
Special, Box Type Milling ... C36
Special Purpose Horizontal Milling ... C36
Special, Ingot Scalping ... H
Special, Keyway ... H
Special, Line Milling ... C36
Special, Milling and Shaving ... C36
10" vertical travel, up to 10' cross rail, Portable ... F12
Special, Portable ... M36
Special, Planetary Milling ... C36
Special, Process, Special Design ... H
Special, Rail Ending ... C36
Special, Single and Multiple Column ... M36
Special Purpose Vertical Milling ... C36
Special, Vertical Rod Milling ... C36
Special, Vertical Rotary, Continuous ... C36
Special, Rotary Table ... H
Special, 4 way, Hollow ... L17

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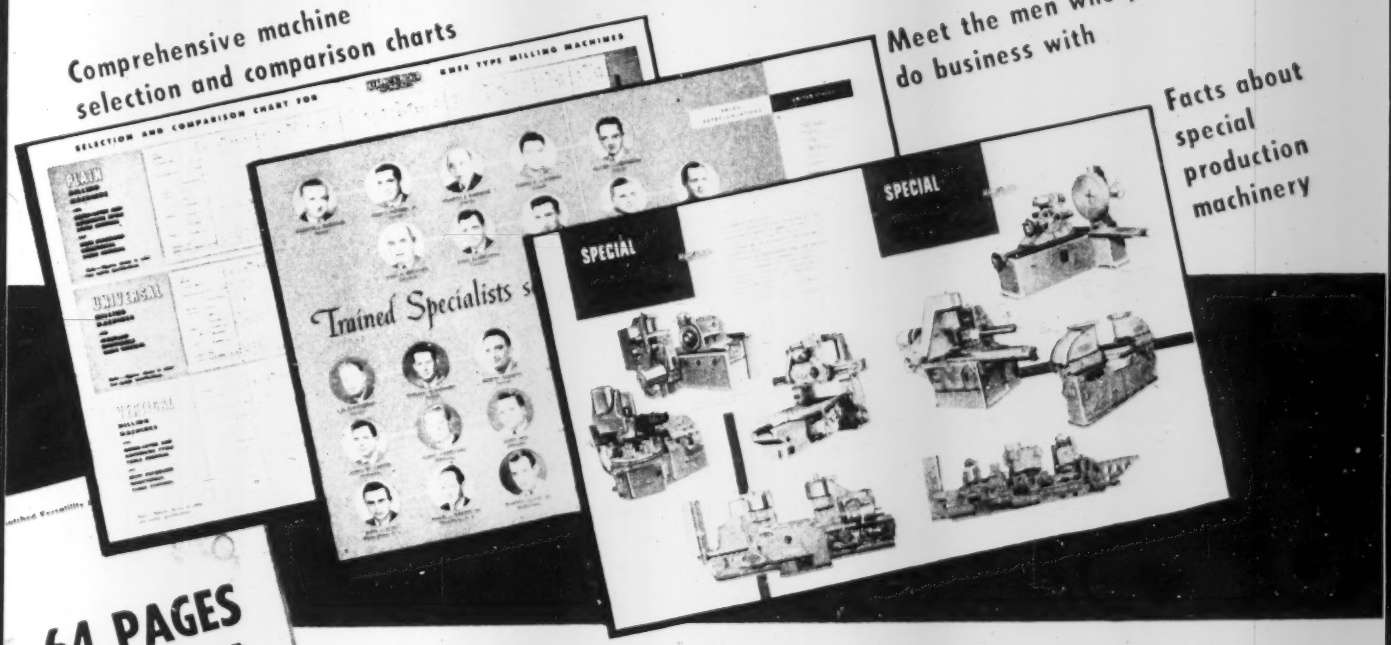
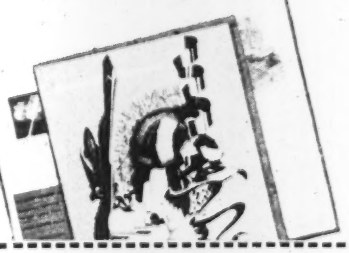


64 PAGES OF DATA you'll want to have



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✓ A background on knee-type, plain, universal and vertical milling machines.

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VERTICAL MILLING MACHINE

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VERTICAL & HORIZONTAL
MILLING MACHINE

The high precision Fray 10-R vertical mill performs an unequalled range of operations. You can machine at any angle — vertical, horizontal, or both . . . and mill, drill or bore at any angle. On any single piece of precision work requiring a variety of operations it is faster and easier to reset the Fray than to transfer the work. The 10-R mills three angles without changing set-up. When working deep dies or standard fixtures there's plenty of extra working range . . . from the vertical spindle to table when down, it offers 22" of vertical travel. (For vertical and regular horizontal milling, the Fray 10-RH is recommended). The 10-R is universal, rugged, and easy to operate.

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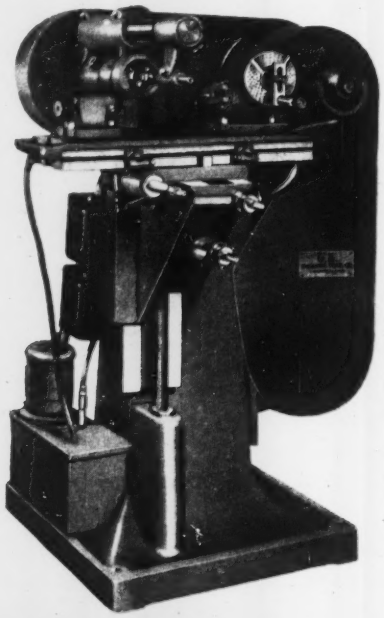
Time proved, shop proved, "U.S. No. 1" heavy duty hand feed milling machines are ideal for tool room and development work. Easily adapted to mass production milling with automatic devices.



Send for complete data on models, attachments, and recommendations for your particular needs.

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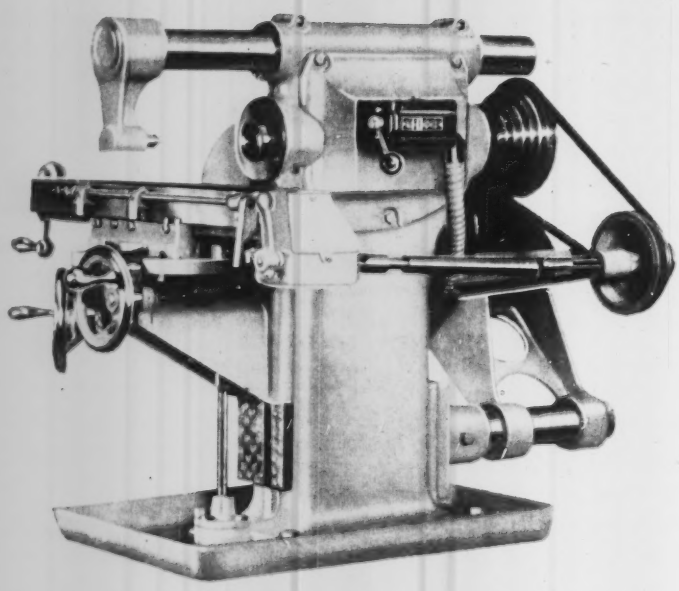

THERE'S A STURDY BURKE FOR EVERY PURPOSE

Thousands of efficient, low cost Burke Bench Milling Machines are proving their superiority for a wide variety of uses.

Burke Power Feed No. 4 pictured at left. Hand feed and Universal models also available.

NEW—3-DIMENSIONAL! Turchan HYDRO-ROUTER

- SERVO-CONTROLLED
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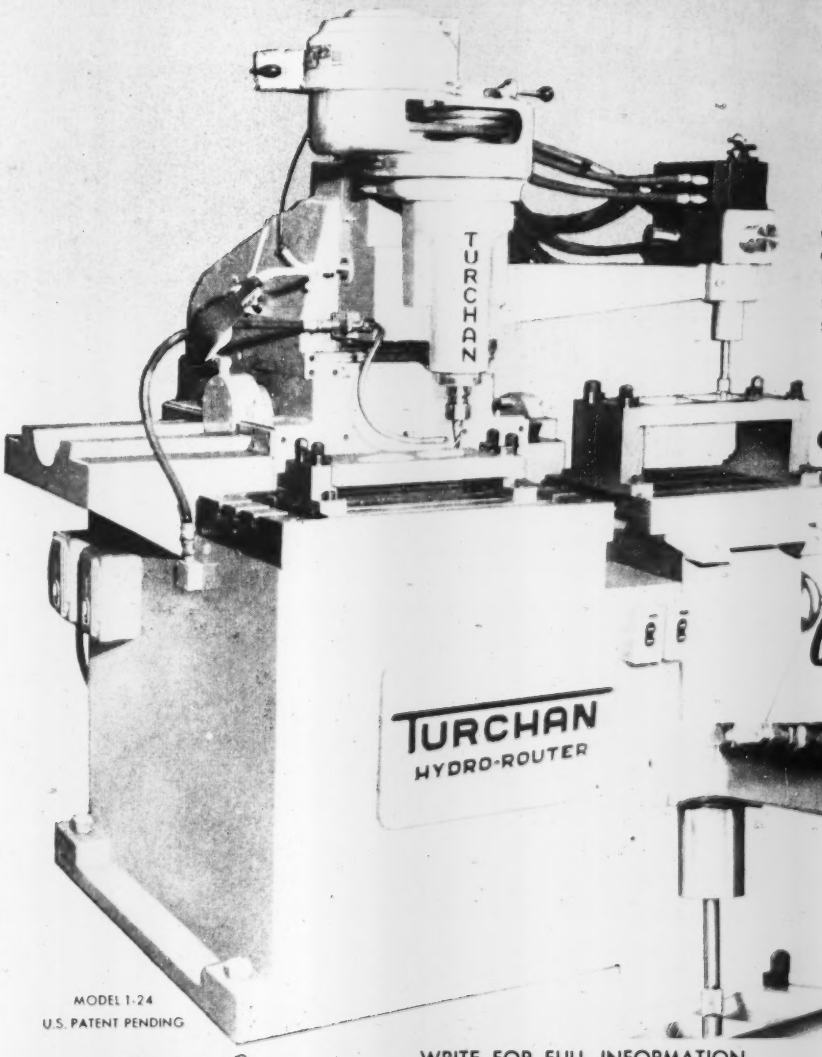
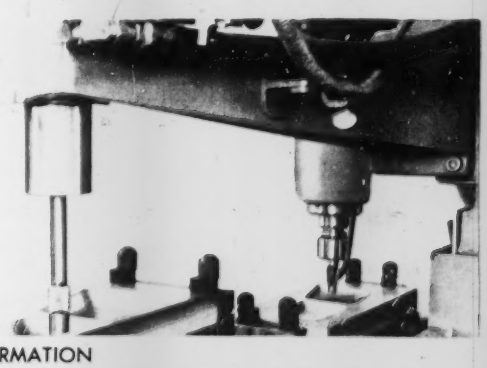
- SIMPLIFIES COMPLEX MILLING and ROUTING



MODEL 1-24
U.S. PATENT PENDING

Greater sensitivity, accuracy and increased duplicating speed result in hours of costly time saved on dies, forms and moulds with Turchan's new Hydro-Router. Controls are grouped in easy reach of operator; virtually eliminating fatigue. Infinitely variable automatic tracer-controls produce a superior finish. Turchan Hydro-Routers available in many sizes; each with a wide range of speeds and feeds.

Turchan has what industry needs in the trend to Automation



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Get Profitable Methods *plus* Advanced Machine Design

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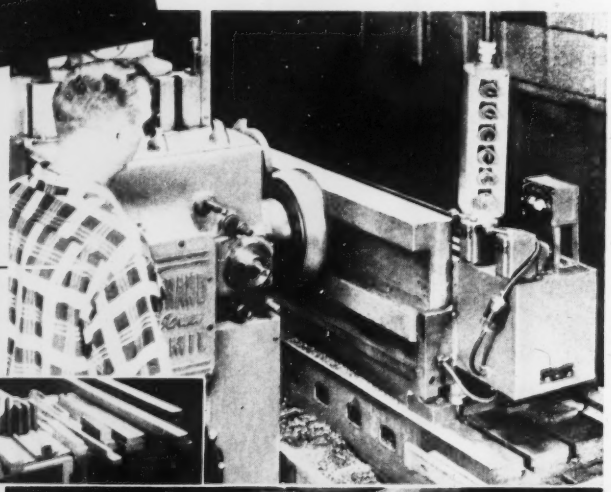
SUNDSTRAND "Engineered Production" Service

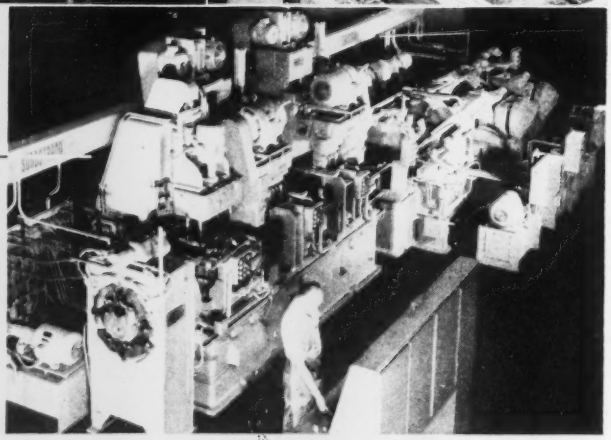
Here are some representative examples of machine tools and services offered by the Machine Tool Division of Sundstrand. Standard basic machine designs and units, coupled with methods engineering assistance, have resulted in many cost-saving Sundstrand installations. If you have metal working operations in your plant and are interested in lowering manufacturing costs, call in a Sundstrand representative. He'll be glad to assist you in obtaining more economical methods. There is no obligation for this service.

Small Lot Milling with Fast Magnetic Clamping



Sundstrand Model 33 Rigidmil equipped with a Sundstrand Magnetic Fixture. Parts machined include tool blocks, cam bars, tool slides, motor brackets, etc. Lot sizes vary from 1 to 25 pieces, and time reduction averages 50% over former method. In addition to saving time through the elimination of mechanical clamps, these magnetic fixtures save the costs of special jigs or fixtures.

Multi-Station Automatic Transfer Rigidmil

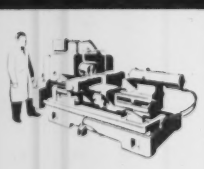


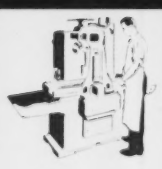
Here is an interesting example of Sundstrand "Engineered Production" as applied to interlocking several machine elements into continuous flow production. It is a Sundstrand special purpose 9 station transfer or process type machine designed and built to drill and ream locating holes, mill bearing sides and odd pads on cylinder blocks. Controls are operated from a floor mounted console type control station and are designed to cycle the complete unit individually or provide complete interlocking of the cycle with several other machines. Production is 80 pieces per hour.

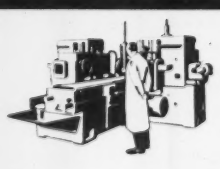
SUNDSTRAND "Engineered Production" Service*

*REG. U.S. PAT. OFF.

AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS



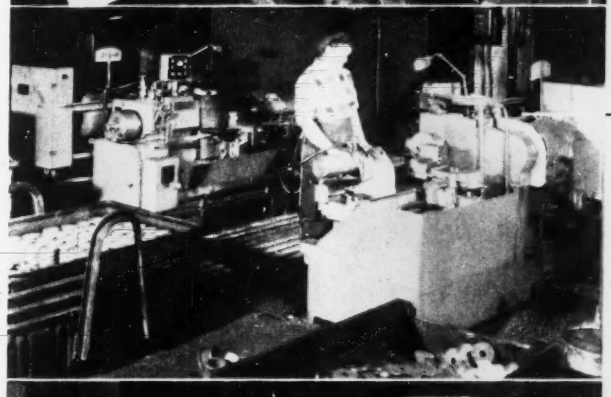




Hopper Loading for Production Turning

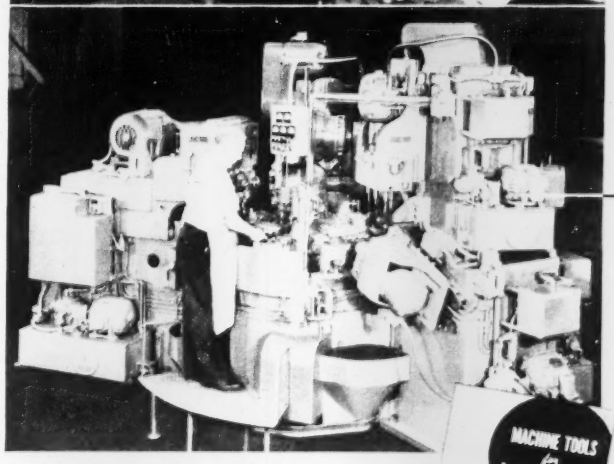
This Sundstrand Model 8A Automatic Lathe turns and chamfers three different lengths and diameters of master track link pins. Operator loads parts into a hopper loader and automatic machine cycle is started with chucking of part.

When machine cycle is completed and the front slide has returned to the starting position, a work ejector pushes the pins out of the chuck and into the unloading vee. Machine will run automatically with one filling of the hopper for approximately 10 minutes.



Small Lot Turning

Illustration at left shows two of a battery of Sundstrand Automatic Lathes that increase production better than 2 to 1 over former method. Lot sizes, for the many different parts run over these machines, vary from 150 to 200 pieces. Parts are of cast iron and steel and are used in production of heavy machinery. The units in this battery of Automatic Lathes are installed with facing fronts, as shown in the above illustration. Because of the simplicity of operation, one operator can easily run two machines.



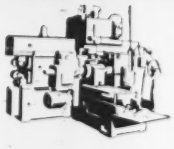
Multi-Station Automatic Indexing Machine

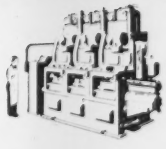
Special Sundstrand Five Station Process Machine for milling port faces and angle pads, drilling port faces and counter-boring angle pad of manifold part. This irregularly shaped part is located and clamped at station #1 and then indexed thru the remaining four work stations to complete the machining with one handling of the workpiece. Production is approximately 115 pieces per hour.

FREE DATA

Additional information on the complete line of Sundstrand machines is available. Ask for bulletin *ST-137*

TRIPLEX RIGIDMILS | **SPECIAL MACHINES**





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Machine Tool Co.

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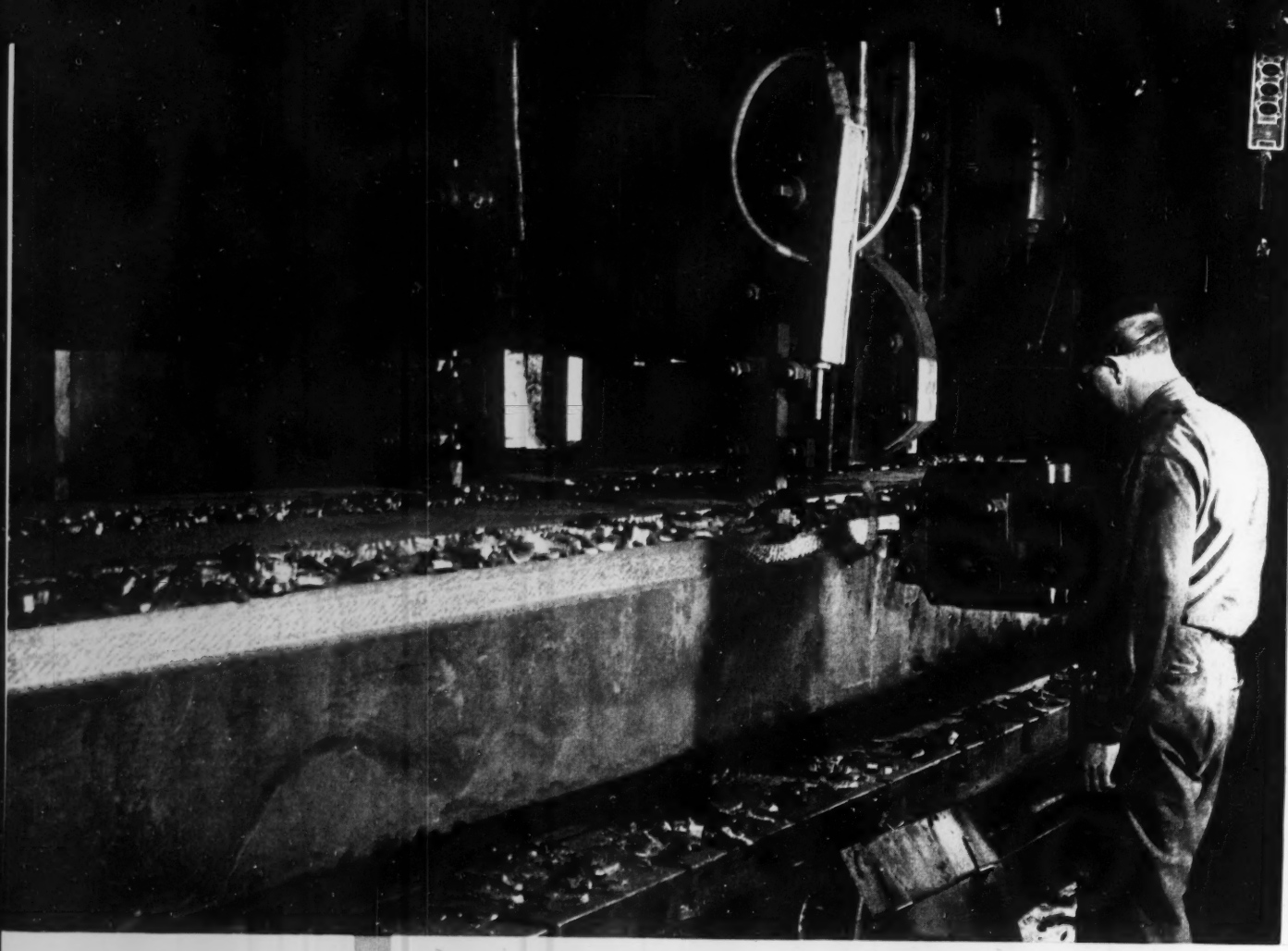

MANUFACTURERS IN THIS SECTION

SECTION 8

Planers

Baldwin-Lima-Hamilton Corp.—B4

Baldwin-Lima-Hamilton Corp.
Eddystone Div.—B5

Clearing Machine Corp.—C17

Cleveland Planer Co.—C24

Cleveland Punch & Shear Works Co.—C25

Consolidated Machine Tool Corp.
Div. of Farrel Birmingham Co.—C36

Espen-Lucas Machine Works—E17

Giddings & Lewis Machine Tool Co.—G8

G. A. Gray Co.—G20

Mesta Machine Co.—M18

Rockford Machine Tool Co.—R14

Thomas Machine Mfg. Co.—T6

PLANERS

(Code number following each listing indicates manufacturer, key on page 82)

Double Housing Planers

Mechanical Standard

24" width, 6' stroke C17
24" width, 6' stroke, plus any additional length in 2' increments G8
24" width, 6' to 24' stroke ... G20
24" width, 8' stroke C17
24" width, 10' stroke C17
24" width, 12' stroke C17
24" width, 14' stroke C17
24" width, 16' stroke C17
24" width, 18' stroke C17
30" width, 6' stroke, plus any additional length in 2' increments G8
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30" width, 8' stroke G20
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30" width, 20' stroke C17
30" width, 20' stroke G20
30" width, 22' stroke C17
36" width, 6' stroke plus any additional length in 2' increments G8
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36" width, 8' stroke G20
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60" width, 34' stroke C17
60" width, 34' stroke G20
60" width, 36' stroke C17
60" width, 36' stroke G20
62" width, 12' stroke plus any additional length in 2' increments G8
72" width and up C36
72" width, 12' stroke B4
72" width, 12' stroke C17
72" width, 12' stroke plus any additional length in 2' increments G8
72" width, 12' stroke G20
72" width, 14' stroke B4
72" width, 14' stroke C17
72" width, 14' stroke G20
72" width, 16' stroke B4
72" width, 16' stroke C17
72" width, 16' stroke G20
72" width, 18' stroke B4
72" width, 18' stroke C17
72" width, 18' stroke G20
72" width, 20' stroke B4
72" width, 20' stroke C17
72" width, 20' stroke G20
72" width, 22' stroke B4
72" width, 22' stroke C17
72" width, 22' stroke G20
72" width, 24' stroke B4
72" width, 24' stroke C17
72" width, 24' stroke G20
72" width, 26' stroke B4
72" width, 26' stroke C17
72" width, 26' stroke G20
72" width, 28' stroke B4
72" width, 28' stroke C17
72" width, 28' stroke G20
72" width, 30' stroke B4
72" width, 30' stroke C17
72" width, 30' stroke G20
72" width, 32' stroke B4
72" width, 32' stroke C17
72" width, 32' stroke G20
72" width, 34' stroke B4
72" width, 34' stroke C17
72" width, 34' stroke G20
72" width, 36' stroke B4
72" width, 36' stroke C17
72" width, 36' stroke G20
72" width, 38' stroke B4
72" width, 38' stroke C17
72" width, 38' stroke G20
72" width, 40' stroke B4
72" width, 40' stroke C17
72" width, 40' stroke G20
84" width, 12' stroke C17
84" width, 12' stroke plus any additional length in 2' increments G8
84" width, 12' stroke G20
84" width, 14' stroke C17
84" width, 14' stroke G20
84" width, 16' stroke C17
84" width, 16' stroke G20
84" width, 18' stroke C17
84" width, 18' stroke G20
84" width, 20' stroke C17
84" width, 20' stroke G20
84" width, 22' stroke C17
84" width, 22' stroke G20
84" width, 24' stroke C17
84" width, 24' stroke G20
84" width, 26' stroke C17
84" width, 26' stroke G20
84" width, 28' stroke C17
84" width, 28' stroke G20
84" width, 30' stroke C17
84" width, 30' stroke G20
84" width, 32' stroke C17
84" width, 32' stroke G20
84" width, 34' stroke C17
84" width, 34' stroke G20
84" width, 36' stroke C17
84" width, 36' stroke G20
84" width, 38' stroke C17
84" width, 38' stroke G20
84" width, 40' stroke C17
84" width, 40' stroke G20
84" width, 42' stroke G20
96" width, 12' stroke C17
96" width, 12' stroke plus any additional length in 2' increments G8
96" width, 14' stroke C17
96" width, 16' stroke C17
96" width, 16' stroke G20
96" width, 18' stroke C17
96" width, 18' stroke G20
96" width, 20' stroke C17
96" width, 20' stroke G20
96" width, 22' stroke C17
96" width, 22' stroke G20
96" width, 24' stroke C17
96" width, 24' stroke G20
96" width, 26' stroke C17
96" width, 26' stroke G20
96" width, 28' stroke C17
96" width, 28' stroke G20
96" width, 30' stroke C17
96" width, 30' stroke G20
96" width, 32' stroke C17
96" width, 32' stroke G20
96" width, 34' stroke C17
96" width, 34' stroke G20
96" width, 36' stroke C17
96" width, 36' stroke G20
96" width, 38' stroke C17
96" width, 38' stroke G20
96" width, 40' stroke C17
96" width, 40' stroke G20
96" width, 42' stroke C17
96" width, 42' stroke G20
108" width, 12' stroke G20
108" width, 14' stroke G20
108" width, 16' stroke G20
108" width, 18' stroke G20
108" width, 20' stroke G20
108" width, 22' stroke G20
108" width, 24' stroke G20
108" width, 26' stroke G20
108" width, 28' stroke G20
108" width, 30' stroke G20
108" width, 32' stroke G20
108" width, 34' stroke G20
108" width, 36' stroke G20
108" width, 38' stroke G20
108" width, 40' stroke G20
108" width, 42' stroke G20
120" width, 12' stroke C17
120" width, 12' stroke plus any additional length in 2' increments G8
120" width, 14' stroke C17
120" width, 16' stroke C17
120" width, 18' stroke C17
120" width, 18' stroke G20
120" width, 20' stroke C17
120" width, 20' stroke G20
120" width, 22' stroke C17
120" width, 22' stroke G20
120" width, 24' stroke C17
120" width, 24' stroke G20
120" width, 26' stroke C17
120" width, 26' stroke G20
120" width, 28' stroke C17
120" width, 28' stroke G20
120" width, 30' stroke C17
120" width, 30' stroke G20
120" width, 32' stroke C17
120" width, 32' stroke G20
120" width, 34' stroke C17
120" width, 34' stroke G20
120" width, 36' stroke C17
120" width, 36' stroke G20
120" width, 38' stroke C17
120" width, 38' stroke G20
120" width, 40' stroke C17
120" width, 40' stroke G20
120" width, 42' stroke G20
120" width, 44' stroke G20
120" width, 46' stroke G20
120" to 216" wide M18
132" width, 12' stroke C17
132" width, 14' stroke C17
132" width, 16' stroke C17
132" width, 18' stroke C17
132" width, 20' stroke C17
132" width, 22' stroke C17
132" width, 24' stroke C17
132" width, 26' stroke C17
132" width, 28' stroke C17
132" width, 30' stroke C17
132" width, 32' stroke C17
132" width, 34' stroke C17
132" width, 36' stroke C17
132" width, 38' stroke C17
132" width, 40' stroke C17
132" width, 42' stroke C17
132" width, 44' stroke C17
144" width, 12' stroke plus any additional length in 2' increments G8
144" width, 18' stroke G20
144" width, 20' stroke G20
144" width, 22' stroke G20
144" width, 24' stroke G20
144" width, 26' stroke G20
144" width, 28' stroke G20
144" width, 30' stroke G20
144" width, 32' stroke G20
144" width, 34' stroke G20
144" width, 36' stroke G20
144" width, 38' stroke G20
144" width, 40' stroke G20
144" width, 42' stroke G20
144" width, 44' stroke G20
144" width, 46' stroke G20
15' max. width B4

Mechanical Widened

48" width, 10' stroke G20
48" width, 12' stroke G20
48" width, 14' stroke G20
48" width, 16' stroke G20
48" width, 18' stroke G20
48" width, 20' stroke G20
48" width, 22' stroke G20
48" width, 24' stroke G20
48" width, 26' stroke G20
48" width, 28' stroke G20
48" width, 30' stroke G20
54" width, 10' stroke G20
54" width, 12' stroke G20
54" width, 14' stroke G20
54" width, 16' stroke G20
54" width, 18' stroke G20
54" width, 20' stroke G20
54" width, 22' stroke G20
54" width, 24' stroke G20
54" width, 26' stroke G20
54" width, 28' stroke G20
54" width, 30' stroke G20
60" width, 10' stroke G20
60" width, 12' stroke G20
60" width, 14' stroke G20
60" width, 16' stroke G20
60" width, 18' stroke G20
60" width, 20' stroke G20
60" width, 22' stroke G20
60" width, 24' stroke G20
60" width, 26' stroke G20
60" width, 28' stroke G20
60" width, 30' stroke G20
60" width, 32' stroke G20
60" width, 34' stroke G20
60" width, 36' stroke G20
62" width, 10' stroke G20
62" width, 12' stroke G20
62" width, 14' stroke G20
62" width, 16' stroke G20
62" width, 18' stroke G20
62" width, 20' stroke G20
62" width, 22' stroke G20
62" width, 24' stroke G20
62" width, 26' stroke G20
62" width, 28' stroke G20
62" width, 30' stroke G20
62" width, 32' stroke G20
62" width, 34' stroke G20
62" width, 36' stroke G20

PLANERS

(Code number following each listing indicates manufacturer, key on page 821)

Double Housing Planers

Mechanical Widened
(Continued)

72" width, 10' stroke G20
72" width, 12' stroke G20
72" width, 14' stroke G20
72" width, 16' stroke G20
72" width, 18' stroke G20
72" width, 20' stroke G20
72" width, 22' stroke G20
72" width, 24' stroke G20
72" width, 26' stroke G20
72" width, 28' stroke G20
72" width, 30' stroke G20
72" width, 32' stroke G20
72" width, 34' stroke G20
72" width, 36' stroke G20
84" width, 10' stroke G20
84" width, 12' stroke G20
84" width, 14' stroke G20
84" width, 16' stroke G20
84" width, 18' stroke G20
84" width, 20' stroke G20
84" width, 22' stroke G20
84" width, 24' stroke G20
84" width, 26' stroke G20
84" width, 28' stroke G20
84" width, 30' stroke G20
84" width, 32' stroke G20
84" width, 34' stroke G20
84" width, 36' stroke G20
84" width, 38' stroke G20
84" width, 40' stroke G20
96 width, 12' stroke G20
96 width, 14' stroke G20
96 width, 16' stroke G20
96 width, 18' stroke G20
96 width, 20 stroke G20
96 width, 22 stroke G20
96" width, 24' stroke G20
96" width, 26' stroke G20
96" width, 28' stroke G20
96" width, 30' stroke G20
96" width, 32' stroke G20
96" width, 34' stroke G20
96" width, 36' stroke G20
96" width, 38' stroke G20
96" width, 40' stroke G20
108" width, 12' stroke G20
108" width, 14' stroke G20
108" width, 16' stroke G20
108" width, 18' stroke G20
108" width, 20' stroke G20
108" width, 22' stroke G20
108" width, 24' stroke G20
108" width, 26' stroke G20
108" width, 28' stroke G20
108" width, 30' stroke G20
108" width, 32' stroke G20
108" width, 34' stroke G20
108" width, 36' stroke G20
108" width, 38' stroke G20
108" width, 40' stroke G20

Hydraulic Standard

36" width, 10' stroke R14
36" width, 12' stroke R14
36" width, 14' stroke R14
36" width, 16' stroke R14
36" width, 18' stroke R14
36" width, 20' stroke R14
42" width, 10' stroke R14
42" width, 12' stroke R14
42" width, 14' stroke R14
42" width, 16' stroke R14
42" width, 18' stroke R14
42" width, 20' stroke R14
48" width, 10' stroke R14
48" width, 12' stroke R14
48" width, 14' stroke R14
48" width, 16' stroke R14
48" width, 18' stroke R14
48" width, 20' stroke R14
60" width, 10' stroke R14
60" width, 12' stroke R14
60" width, 14' stroke R14
60" width, 16' stroke R14
60" width, 18' stroke R14
60" width, 20' stroke R14
72" width, 10' stroke R14
72" width, 12' stroke R14
72" width, 14' stroke R14
72" width, 16' stroke R14
72" width, 18' stroke R14
72" width, 20' stroke R14

Die Block

36" width, 10' stroke C17
36" width, 12' stroke C17
36" width, 14' stroke C17
36" width, 16' stroke C17
36" width, 18' stroke C17
36" width, 20' stroke C17
42" width, 10' stroke G20
42" width, 12' stroke G20
42" width, 14' stroke G20
42" width, 16' stroke G20
48" width, 10' stroke C17
48" width, 12' stroke C17
48" width, 14' stroke C17
48" width, 16' stroke C17
48" width, 18' stroke C17
48" width, 20' stroke C17
60" width, 10' stroke C17
60" width, 12' stroke C17
60" width, 14' stroke C17
60" width, 16' stroke C17
60" width, 18' stroke C17
60" width, 20' stroke C17
60" width, 22' stroke C17

Frog & Switch

36" width, 10' stroke C17
36" width, 12' stroke C17
36" width, 14' stroke C17
36" width, 16' stroke C17
36" width, 18' stroke C17
36" width, 20' stroke C17
42" width, 10' stroke C17
42" width, 10' stroke G20
42" width, 12' stroke C17
42" width, 12' stroke G20
42" width, 14' stroke C17
42" width, 14' stroke G20
42" width, 16' stroke C17
42" width, 16' stroke G20
42" width, 18' stroke C17
42" width, 18' stroke G20
42" width, 20' stroke C17
42" width, 20' stroke G20
42" width, 22' stroke G20
42" width, 30' stroke G20
48" width, 10' stroke C17
48" width, 12' stroke C17
48" width, 14' stroke C17
48" width, 16' stroke C17
48" width, 18' stroke C17
48" width, 20' stroke C17

Openside Planers

Mechanical Standard

24" width, 6' stroke C17
24" width, 6' stroke plus any additional length in 2' increments G8
24" width, 8' stroke C17
24" width, 10' stroke C17
24" width, 12' stroke C17
24" width, 14' stroke C17
24" width, 16' stroke C17
24" width, 18' stroke C17
26" width, 6' stroke C24
26" width, 8' stroke C24
26" width, 10' stroke C24
26" width, 12' stroke C24
26" width, 14' stroke C24
26" width, 16' stroke C24
26" width, 18' stroke C24
26" width, 20' stroke C24
30" width, 6' stroke plus any additional length in 2' increments G8
30" width, 8' stroke C17
30" width, 8' stroke C24
30" width, 10' stroke C17
30" width, 10' stroke C24
30" width, 12' stroke C17
30" width, 12' stroke C24
30" width, 14' stroke C17
30" width, 14' stroke C24
30" width, 16' stroke C17
30" width, 16' stroke C24
30" width, 18' stroke C17
30" width, 18' stroke C24
30" width, 20' stroke C17
30" width, 20' stroke C24
30" width, 22' stroke C17
36" width, 6' stroke plus any additional length in 2' increments G8
36" width, 8' stroke C17
36" width, 8' stroke C24
36" width, 8' stroke;
Heavy Duty G20
36" width, 10' stroke C17
36" width, 10' stroke C24
36" width, 10' stroke;
Heavy Duty G20
36" width, 12' stroke C17
36" width, 12' stroke C24
36" width, 12' stroke;
Heavy Duty G20
36" width, 14' stroke C17
36" width, 14' stroke C24
36" width, 14' stroke;
Heavy Duty G20
36" width, 16' stroke C17
36" width, 16' stroke C24
36" width, 16' stroke;
Heavy Duty G20
36" width, 18' stroke C17
36" width, 18' stroke C24
36" width, 18' stroke;
Heavy Duty G20
36" width, 20' stroke C17
36" width, 20' stroke C24
36" width, 20' stroke;
Heavy Duty G20
36" width, 22' stroke C17
36" width, 22' stroke C24
36" width, 22' stroke;
Heavy Duty G20
36" width, 24' stroke C17
36" width, 24' stroke C24
36" width, 24' stroke;
Heavy Duty G20
42" width, 8' stroke;
Heavy Duty G20
42" width, 10' stroke C17
42" width, 10' stroke C24
42" width, 10' stroke plus any additional length in 2' increments G8
42" width, 10' stroke;
Heavy Duty G20
42" width, 12' stroke C17
42" width, 12' stroke C24
42" width, 12' stroke;
Heavy Duty G20
42" width, 14' stroke C17
42" width, 14' stroke C24
42" width, 14' stroke;
Heavy Duty G20
42" width, 16' stroke C17
42" width, 16' stroke C24
42" width, 16' stroke;
Heavy Duty G20
42" width, 18' stroke C17
42" width, 18' stroke C24
42" width, 18' stroke;
Heavy Duty G20
42" width, 20' stroke C17
42" width, 20' stroke C24
42" width, 20' stroke;
Heavy Duty G20
42" width, 22' stroke C17
42" width, 22' stroke C24
42" width, 22' stroke;
Heavy Duty G20
42" width, 24' stroke C17
42" width, 24' stroke C24
42" width, 24' stroke;
Heavy Duty G20
42" width, 26' stroke C17
42" width, 26' stroke C24
42" width, 26' stroke;
Heavy Duty G20
42" width, 28' stroke C17
42" width, 28' stroke;
Heavy Duty G20
42" width, 30' stroke C17
48" width, 10' stroke C17
48" width, 10' stroke plus any additional length in 2' increments G8
48" width, 10' stroke;
Heavy Duty G20
48" width, 12' stroke C17
48" width, 12' stroke C24
48" width, 12' stroke;
Heavy Duty G20
48" width, 14' stroke C17
48" width, 14' stroke C24
48" width, 14' stroke;
Heavy Duty G20
48" width, 16' stroke C17
48" width, 16' stroke C24
48" width, 16' stroke;
Heavy Duty G20
48" width, 18' stroke C17
48" width, 18' stroke C24
48" width, 18' stroke;
Heavy Duty G20
48" width, 20' stroke C17
48" width, 20' stroke C24
48" width, 18' stroke
Heavy Duty G20
48" width, 22' stroke C17
48" width, 22' stroke C24
48" width, 20' stroke;
Heavy Duty G20
48" width, 24' stroke C17
48" width, 24' stroke C24
48" width, 24' stroke;
Heavy Duty G20
48" width, 26' stroke C17
48" width, 26' stroke C24
48" width, 26' stroke;
Heavy Duty G20
48" width, 28' stroke C17
48" width, 28' stroke C24
48" width, 28' stroke;
Heavy Duty G20
48" width, 30' stroke C17
48" width, 30' stroke C24
48" width, 30' stroke;
Heavy Duty G20
48" width, 32' stroke;
Heavy Duty G20
48" width, 34' stroke;
Heavy Duty G20
48" width, 36' stroke;
Heavy Duty G20
54" width, 10' stroke C17
54" width, 12' stroke C17
54" width, 14' stroke C17
54" width, 16' stroke C17
54" width, 18' stroke C17
54" width, 20' stroke C17
54" width, 22' stroke C17
54" width, 24' stroke C17
54" width, 26' stroke C17
54" width, 28' stroke C17
54" width, 30' stroke C17
54" width, 32' stroke C17
54" width, 34' stroke C17
54" width, 36' stroke C17
60" width, 12' stroke C17
60" width, 12' stroke
Heavy Duty G20
60" width, 14' stroke C17
60" width, 14' stroke;
Heavy Duty G20
60" width, 16' stroke C17
60" width, 16' stroke
Heavy Duty G20
60" width, 18' stroke C17
60" width, 18' stroke;
Heavy Duty G20
60" width, 20' stroke C17
60" width, 20' stroke;
Heavy Duty G20
60" width, 22' stroke C17
60" width, 22' stroke;
Heavy Duty G20
60" width, 24' stroke C17
60" width, 24' stroke
Heavy Duty G20
60" width, 26' stroke C17
60" width, 26' stroke;
Heavy Duty G20
60" width, 28' stroke C17
60" width, 28' stroke;
Heavy Duty G20
60" width, 30' stroke C17
60" width, 30' stroke;
Heavy Duty G20
60" width, 32' stroke C17
60" width, 32' stroke;
Heavy Duty G20
60" width, 34' stroke C17
60" width, 34' stroke;
Heavy Duty G20
60" width, 36' stroke C17
60" width, 36' stroke;
Heavy Duty G20
62" width, 12' stroke plus any additional length in 2' increments G8
72" width, 12' stroke C17
72" width, 12' stroke plus any additional length in 2' increments G8
72" width, 12' stroke;
Heavy Duty G20
72" width, 14' stroke C17
72" width, 14' stroke;
Heavy Duty G20
72" width, 16' stroke C17
72" width, 16' stroke C24
72" width, 16' stroke;
Heavy Duty G20
72" width, 18' stroke C17
72" width, 18' stroke C24

PLANERS

(Code number following each listing indicates manufacturer, key on page 82)

Openside Planers

Mechanical Standard

(Continued)

72" width, 18' stroke;
Heavy Duty G20
72" width, 20' stroke C17
72" width, 20' stroke C24
72" width, 20' stroke;
Heavy Duty G20
72" width, 22' stroke C17
72" width, 22' stroke C24
72" width, 22' stroke;
Heavy Duty G20
72" width, 24' stroke C17
72" width, 24' stroke C24
72" width, 24' stroke;
Heavy Duty G20
72" width, 26' stroke C17
72" width, 26' stroke C24
72" width, 26' stroke;
Heavy Duty G20
72" width, 28' stroke C17
72" width, 28' stroke C24
72" width, 28' stroke;
Heavy Duty G20
72" width, 30' stroke C17
72" width, 30' stroke C24
72" width, 30' stroke
Heavy Duty G20
72" width, 32' stroke C17
72" width, 32' stroke;
Heavy Duty G20
72" width, 34' stroke C17
72" width, 34' stroke;
Heavy Duty G20
72" width, 36' stroke C17
72" width, 36' stroke;
Heavy Duty G20
72" width, 38' stroke C17
72" width, 38' stroke;
Heavy Duty G20
72" width, 40' stroke C17
72" width, 40' stroke;
Heavy Duty G20
84" width, 12' stroke C17
84" width, 12' stroke plus
any additional length in
2' increments G8
84" width, 12' stroke;
Heavy Duty G20
84" width, 14' stroke C17
84" width, 14' stroke;
Heavy Duty G20
84" width, 16' stroke C17
84" width, 16' stroke;
Heavy Duty G20
84" width, 18' stroke C17
84" width, 18' stroke;
Heavy Duty G20
84" width, 20' stroke C17
84" width, 20' stroke;
Heavy Duty G20
84" width, 22' stroke C17
84" width, 22' stroke;
Heavy Duty G20
84" width, 24' stroke C17
84" width, 24' stroke;
Heavy Duty G20
84" width, 26' stroke C17
84" width, 26' stroke;
Heavy Duty G20
84" width, 28' stroke C17
84" width, 28' stroke;
Heavy Duty G20
84" width, 30' stroke C17
84" width, 30' stroke;
Heavy Duty G20
84" width, 32' stroke C17
84" width, 32' stroke;
Heavy Duty G20
84" width, 34' stroke C17
84" width, 34' stroke;
Heavy Duty G20
84" width, 36' stroke C17
84" width, 36' stroke;
Heavy Duty G20
84" width, 38' stroke C17
84" width, 38' stroke;
Heavy Duty G20
84" width, 40' stroke C17
84" width, 40' stroke;
Heavy Duty G20
96" width, 12' stroke plus
any additional length in
2' increments G8
96" width, 16' stroke;
Heavy Duty G20
96" width, 18' stroke;
Heavy Duty G20
96" width, 20' stroke;
Heavy Duty G20
96" width, 22' stroke;
Heavy Duty G20
96" width, 24' stroke;
Heavy Duty G20
96" width, 26' stroke;
Heavy Duty G20
96" width, 28' stroke;
Heavy Duty G20
96" width, 30' stroke;
Heavy Duty G20
96" width, 32' stroke;
Heavy Duty G20
96" width, 34' stroke;
Heavy Duty G20
96" width, 36' stroke;
Heavy Duty G20
96" width, 38' stroke;
Heavy Duty G20
96" width, 40' stroke;
Heavy Duty G20
96" width, 42' stroke;
Heavy Duty G20
108" width, 12' stroke;
Heavy Duty G20
108" width, 14' stroke;
Heavy Duty G20
108" width, 16' stroke;
Heavy Duty G20
108" width, 18' stroke;
Heavy Duty G20
108" width, 20' stroke;
Heavy Duty G20
108" width, 22' stroke;
Heavy Duty G20
108" width, 24' stroke;
Heavy Duty G20
108" width, 26' stroke;
Heavy Duty G20
108" width, 28' stroke;
Heavy Duty G20
108" width, 30' stroke;
Heavy Duty G20
108" width, 32' stroke;
Heavy Duty G20
108" width, 34' stroke;
Heavy Duty G20
108" width, 36' stroke;
Heavy Duty G20
108" width, 38' stroke;
Heavy Duty G20
108" width, 40' stroke C17
120" width, 12' stroke;
Heavy Duty G20
120" width, 14' stroke;
Heavy Duty G20
120" width, 16' stroke;
Heavy Duty G20
120" width, 18' stroke;
Heavy Duty G20
120" width, 20' stroke;
Heavy Duty G20
120" width, 22' stroke;
Heavy Duty G20
120" width, 24' stroke;
Heavy Duty G20
120" width, 26' stroke;
Heavy Duty G20
120" width, 28' stroke;
Heavy Duty G20
120" width, 30' stroke;
Heavy Duty G20
120" width, 32' stroke;
Heavy Duty G20
120" width, 34' stroke;
Heavy Duty G20
120" width, 36' stroke;
Heavy Duty G20
120" width, 38' stroke;
Heavy Duty G20
120" width, 40' stroke;
Heavy Duty G20
120" width, 42' stroke;
Heavy Duty G20
120" width, 44' stroke;
Heavy Duty G20
120" width, 46' stroke;
Heavy Duty G20

Hydraulic Standard

36" width, 10' stroke R14
36" width, 12' stroke R14
36" width, 14' stroke R14
36" width, 16' stroke R14
36" width, 18' stroke R14
36" width, 20' stroke R14
42" width, 10' stroke R14
42" width, 12' stroke R14
42" width, 14' stroke R14
42" width, 16' stroke R14
42" width, 18' stroke R14
42" width, 20' stroke R14
48" width, 10' stroke R14
48" width, 12' stroke R14
48" width, 14' stroke R14
48" width, 16' stroke R14
48" width, 18' stroke R14
48" width, 20' stroke R14
60" width, 10' stroke R14
60" width, 12' stroke R14
60" width, 14' stroke R14
60" width, 16' stroke R14
60" width, 18' stroke R14
60" width, 20' stroke R14
72" width, 10' stroke R14
72" width, 12' stroke R14
72" width, 14' stroke R14
72" width, 16' stroke R14
72" width, 18' stroke R14
72" width, 20' stroke R14

Convertible

60" width, 8' stroke C17
60" width, 10' stroke C17
60" width, 12' stroke C17
60" width, 14' stroke C17
60" width, 16' stroke C17
60" width, 18' stroke C17
60" width, 20' stroke C17
60" width, 22' stroke C17
60" width, 24' stroke C17
72" width, 10' stroke C17
72" width, 12' stroke C17
72" width, 14' stroke C17
72" width, 16' stroke C17
72" width, 18' stroke C17
72" width, 20' stroke C17
72" width, 22' stroke C17
72" width, 24' stroke C17
72" width, 26' stroke C17
72" width, 28' stroke C17
72" width, 30' stroke C17
72" width, 32' stroke C17
84" width, 10' stroke C17
84" width, 12' stroke C17
84" width, 14' stroke C17
84" width, 16' stroke C17
84" width, 18' stroke C17
84" width, 20' stroke C17
84" width, 22' stroke C17
84" width, 24' stroke C17
84" width, 26' stroke C17
84" width, 28' stroke C17
84" width, 30' stroke C17
84" width, 32' stroke C17
84" width, 34' stroke C17
84" width, 36' stroke C17
96" width, 10' stroke C17
96" width, 12' stroke C17
96" width, 14' stroke C17
96" width, 16' stroke C17
96" width, 18' stroke C17
96" width, 20' stroke C17
96" width, 22' stroke C17
96" width, 24' stroke C17
96" width, 26' stroke C17
96" width, 28' stroke C17
96" width, 30' stroke C17
96" width, 32' stroke C17
96" width, 34' stroke C17
96" width, 36' stroke C17
96" width, 38' stroke C17
108" width, 12' stroke C17
108" width, 14' stroke C17
108" width, 16' stroke C17
108" width, 18' stroke C17
108" width, 20' stroke C17
108" width, 22' stroke C17
108" width, 24' stroke C17
108" width, 26' stroke C17
108" width, 28' stroke C17
108" width, 30' stroke C17
108" width, 32' stroke C17
108" width, 34' stroke C17
108" width, 36' stroke C17
120" width, 12' stroke C17
120" width, 14' stroke C17
120" width, 16' stroke C17
120" width, 18' stroke C17
120" width, 20' stroke C17
120" width, 22' stroke C17
120" width, 24' stroke C17
120" width, 26' stroke C17
120" width, 28' stroke C17
120" width, 30' stroke C17
120" width, 32' stroke C17
120" width, 34' stroke C17
120" width, 36' stroke C17
120" width, 38' stroke C17
120" width, 40' stroke C17

Shaper-Planer

24" width, 42" stroke;
Openside, Hydraulic R14
24" width, 66" stroke;
Openside, Hydraulic R14
24" width, 6' stroke;
Double-Housing, Hydraulic..R14
24" width, 90" stroke;
Openside, Hydraulic R14
24" width, 8' stroke;
Double-Housing, Hydraulic..R14
24" width, 10' stroke;
Double-Housing, Hydraulic..R14
24" width, 120" stroke;
Openside, Hydraulic R14
24" width, 12' stroke;
Double-Housing, Hydraulic..R14
24" width, 144" stroke;
Openside, Hydraulic R14
30" width, 6' stroke;
Double-Housing, Hydraulic..R14
30" width, 8' stroke;
Double-Housing, Hydraulic..R14
30" width, 10' stroke;
Double-Housing, Hydraulic..R14
30" width, 12' stroke;
Double-Housing, Hydraulic..R14
32" width, 42" stroke;
Openside, Hydraulic R14
32" width, 66" stroke;
Openside, Hydraulic R14
32" width, 72" stroke;
Openside, Hydraulic R14
32" width, 90" stroke;
Openside, Hydraulic R14
32" width, 120" stroke;
Openside, Hydraulic R14
32" width, 144" stroke;
Openside, Hydraulic R14
36" width, 6' stroke;
Double-Housing, Hydraulic..R14
36" width, 8' stroke;
Double-Housing, Hydraulic..R14
36" width, 10' stroke;
Double-Housing, Hydraulic..R14
36" width, 12' stroke;
Double-Housing, Hydraulic..R14
Special M36

Plate Planers

Edge Only

Special C36

Edging & Scarfing

20'-40' widths B5
Special C36

Breast Planers

16' wide, 42' long M18

Pit Planers

14' to 18' wide M18
Special C36

Post Planers

35' to 50' traverse M18

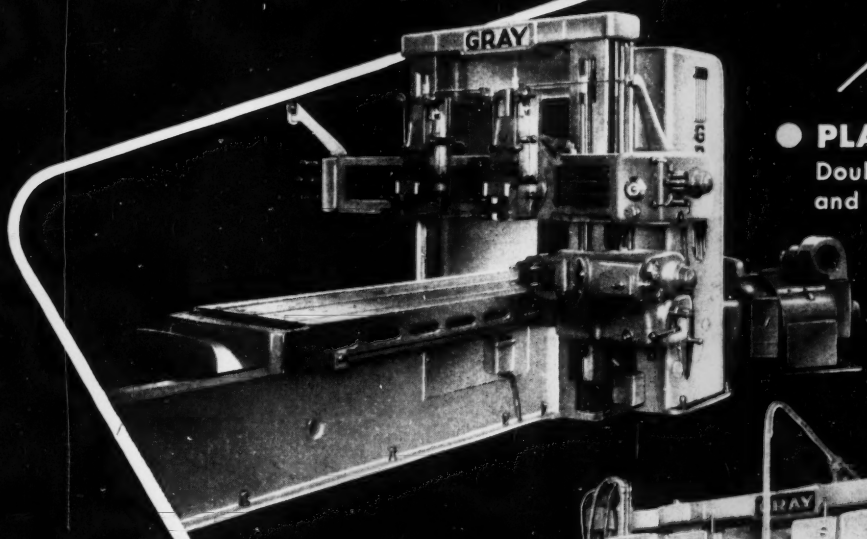
Rotary Planers

9' table B4
11' table B4
30" dia. cutter head C25
30" cutter head, 48" feed E17
36" dia. cutter head C25
36" cutter head, 60" feed E17
42" cutter head, 72" feed E17
50" dia. cutter head C25
60" dia. cutter head C25
Special C36

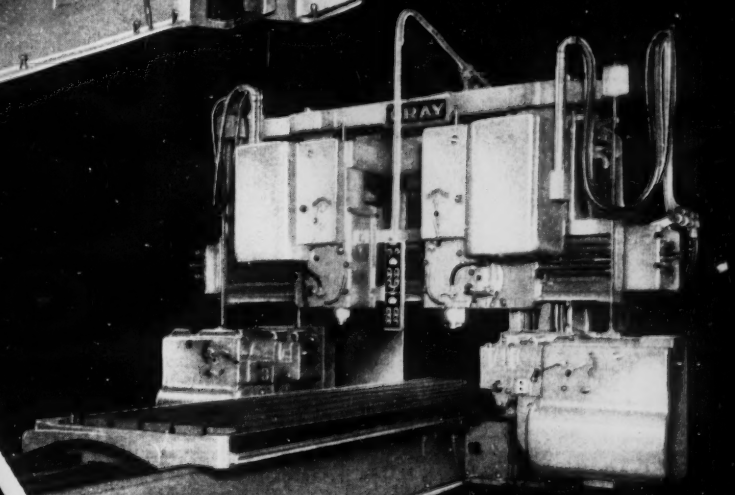
PLANERS
Not Elsewhere Classified

8" x 8" angle; Angle T6
Special, Movable M36

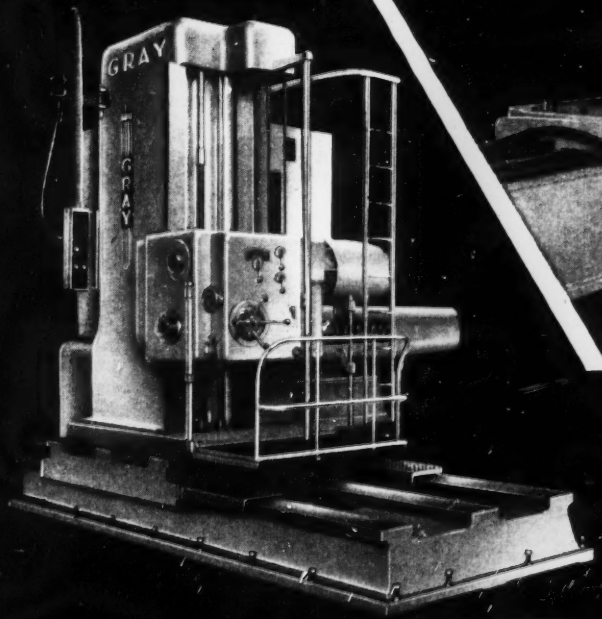
GRAY cost cutters



● **PLANING**
Double Housing
and Openside Types



● **BORING**
5" to 8" Bar Floor
and Planer Types



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Openside Unit Head-
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horizontal boring machines

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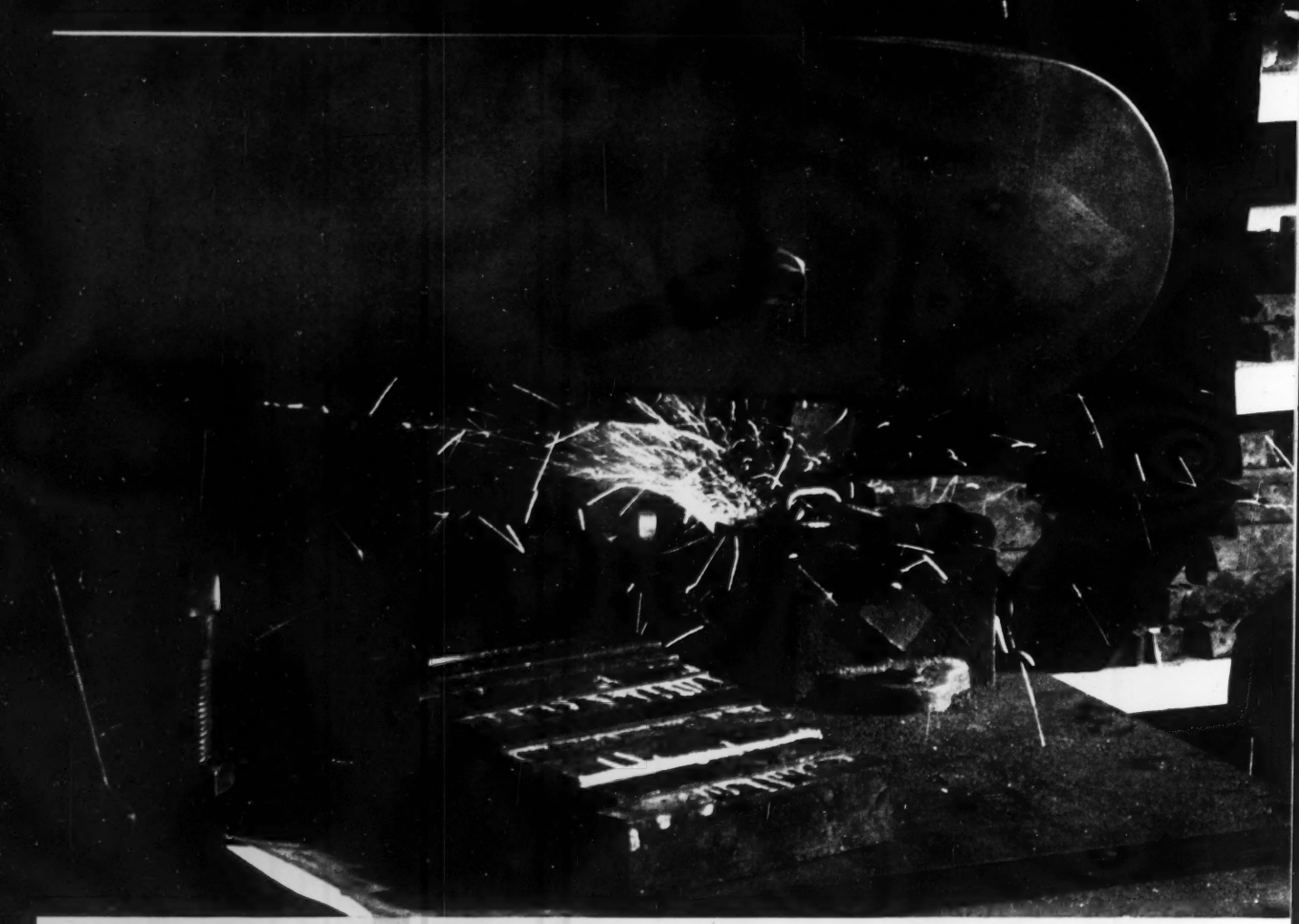

MANUFACTURERS IN THIS SECTION

Abbey Etna Co.—A1
American Chain & Cable Co. Inc.—A14
American Instrument Co.—A15
Armstrong-Blum Mfg. Co.—A19
Bardons & Oliver Inc.—B7
Bett-Marr Mfg. Co.—B17
Black Diamond Saw & Machine Works—B24
Boice Crane Co.—B33
Brown & Sharpe Mfg. Co.—B44
Buehler Ltd.—B46
Champion Blower & Forge Co.—C5
Cincinnati Electrical Tool Co.—C9
Cochrane-Bly Co.—C30
Connecticut Tool & Engineering Co.—C35
Consolidated Machine Tool Corp.
Div. of Farrel Birmingham Co.—C36
Continental Machine Co.—C37
Covel Mfg. Co.—C43
Cox & Sons Co.—C44
Crowningshield Harris Co.—C50
Cedar-West Machine Co.—C55
Delta Tool Div.
Rockwell Mfg. Co.—D6
A. P. Desanno & Son Inc.—D8
Dewalt Inc.—D12
DoAll Co.—D17
Duro Metal Products Co.—D20
Eisler Engineering Co. Inc.—E4
Espen-Lucas Machine Works—E17
Famco Machine Co.—F1
Fox Grinders Inc.—F15
Hanchett Mfg. Co.—H6
Harvey Mfg. Corp.—H11
Heston & Anderson—H18
Hilyard Co.—H21
Hunter Saw & Machine Co.—H28
Ideal Tool & Die Co. Inc.—I1
Illinois Tool Works—I2
Johnson Mfg. Corp.—J4
Kalamazoo Tank & Silo Co.—K1
Keller Tool & Machine Works—K5
Kling Brothers Engineering Works—K12
L W Chuck Co.—L1
William Laidlaw Inc.—L2
Landis Machine Co.—L4
Maquoketa Co.—M3
Miller-Knuth Mfg. Co.—M25
Modern Machine Tool Co.—M30
Motch & Merryweather Machinery Co.—M37
Murchey Div. of Sheffield Corp.—M39
Oliver Instrument Co.—02
Oster Mfg. Co.—05
Peerless Machine Co.—P4
Porter-McLeod Machine Tool Co. Inc.—P13
Producto Machine Co.—P23
Racine Hydraulics & Machinery Inc.—R1
Rehnberg-Jacobson Mfg. Co.—R5
Rice Pump & Machine Co.—R8
J. A. Richards Co.—R9
Wm. Robertson Machine & Foundry Co.
Inc.—R13
Roll-In Saw Co.—R17
Rogersford Foundry & Machine Co. Inc.—R21
William K. Stamets Co.—S29
Stone Machinery Co. Inc.—S33
Tabor Mfg. Co.—T1
Tannewitz Works—T3
Taylor-Wilson Mfg. Co.—T5
Torrington Mfg. Co.—T13
Tyler Mfg. Co.—T17
Walker-Turner Div.
Kearney & Trecker Corp.—W6
Waterbury Farrel Foundry & Machine Co.—W10
Wells Mfg. Corp.—W14
W. F. Wells & Sons—W15
Henry H. Wise Co.—W22
Yates American Machine Co.—Y1

SECTION 9

Cutting, Sawing and Filing Machines

Hack Saw

2½" x 2½" cap.	C5
4" x 4" cap., Draw Cut	A19
4" x 4" cap.	C5
4" cap.	C43
4" x 4" cap., 12" x ⅝" blade, Bench	M25
4" x 4" cap., 12" x ⅝" blade	M25
4" x 4" cap., 12" x 1" blade	M25
4½" x 4½" cap.	P4
5" x 5" cap., Dry, Bench	K5
5" x 5" cap., Dry	K5
6" cap.	R13
6" x 6" cap., Draw Cut	A19
6" x 6" cap., Light Duty, High Speed	A19
6" x 6" cap., High Speed	A19
6" x 6" cap., High Speed, Automatic	A19
6" x 6" cap.	C5
6" x 6" cap.	L1
6" x 6" cap.	M3
6" x 6" cap., Automatic Feed	M3
6" x 6" cap., 12" x 1" blade	M25
6" x 6" cap.	R1
6" x 6" cap.	P4
6" x 6" cap.	R21
6¼" x 6¼" cap., Dry	K5
6¼" x 6¼" cap., Wet	K5
6" x 6" cap., straight cuts 4" cap. at 45° angle, 14" x 1" blade	M25
7" x 7" cap., Wet	K5
8" x 8" cap.	P4
8" cap., Rail Cutting	R1
8" cap.	R13
8" x 12" cap.	R13
8" x 18" cap.	R13
9" cap., Rail Cutting	R1
9" cap.	R13
9" x 9" cap., Wet	K5
10" x 10" cap., High Speed	A19
10" x 10" cap., High Speed, Automatic	A19
10" x 10" cap.	M3
10" x 10" cap., Automatic Feed	M3
10" x 10" cap.	P4
10" x 10" cap.	R1
11" x 11" cap.	P4
12" x 12" cap.	R1
12" x 16" cap.	R1
13" cap.	R13
13" x 16" cap.	P4
13" x 16" cap.	R13
14" x 14" cap.	P4
14" x 20" cap.	R1
18" x 18" cap., Hydraulic	A19
18" x 18" cap., Vertical	P4
20" x 20" cap.	R1
24" x 24" cap., Hydraulic	A19

Circular Cutoff Saw including Swing Frame

⅝" dia. cap., Scarfing	W10
1" dia. cap., Scarfing	W10
1½" dia. cap., 8" or 10" saw, Pedestal	D6
2" dia. cap.	C30
2" dia. cap.	M37
3" dia. cap.	M37
3" dia. cap.	W10
3½" dia. cap., Tilting Arbor	W6
4" dia. cap.	C30
4" dia. cap.	E17
4½" dia. cap., Tilting Arbor	W6
6" dia. cap.	E17
6" dia. cap.	M37
7" dia. cap.	C30
7" dia. cap.	E17
7" dia. cap.	W10
8" dia. cap.	C30
8" dia. cap.	E17
8" dia. cap.	P13
9" dia. cap.	E17
10" dia. cap.	C30
10" dia. cap.	E17
10" blade cap., Swing Frame	H18
10½" dia. cap.	E17
10½" dia. cap.	M37
12" dia. cap.	C30
12" dia. cap.	E17
12" blade cap., Swing Frame	H18
15" dia. cap.	E17
14" saw	H28
14" blade cap., Swing Frame	H18
15" dia. cap.	E17
16" dia. cap.	E17

CUTTING, SAWING AND FILING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Sawing and Cutoff Machines

Circular Cutoff Saw including Swing Frame

(Continued)

16" dia. wheel, Swing Frame F15
16" blade cap., Swing Frame H18
16½" dia. cap. M37
17" dia. cap. E17
18" saw H28
20" dia. cap. C30
20" dia. cap. E17
20" dia. wheel, Swing Frame F15
21" dia. cap. E17
22" dia. cap. E17
24" dia. cap. E17
24" saw H28
24" saw, Tube Rotating H28
30" dia. cap. C30
30" dia. cap. E17
30" saw H28
30" dia. cap. M37
31" dia. cap. E17
34" dia. cap. E17
38" dia. cap. E17
44" dia. cap. E17
84" dia. cap. E17
155 mm shell forging M37
Special C36

Abrasive Cutoff

½" cap. B46
¾" cap., Pedestal D6
¾" cap., Disk D8
1" dia. solid, 2" dia. tube, Dry A14
1" dia. solid, 2" dia. tube, Wet A14
1" cap. B46
1¼" cap. solid, Disk D8
1½" cap. solid D12
1½" cap. solid, 2" tube cap., Bench P13
1½" cap. solid, 2" tube cap., Floor P13
1½" cap. solid S39
2" cap., Disk D8
2" cap. solid D12
2" cap. pipe S39
2" cap. T1
2" dia. solid, 3½" dia. tube, Dry A14
2" dia. solid, 4" dia. tube, Wet A14
2" dia. solid, 4" tube, Automatic, Wet A14
2" dia. solid, 4" tube, Hydraulic, Wet A14
2½" dia., 2½" tools, Tool Trimmer, Wet A14
2½" dia. wire rope, Wire Rope Cutter, Dry A14
2½" cap. solid, Disk D8
2½" cap. solid, 4" pipe S39
3" work cap., Wet A15
3" work cap., Radial W6
3½" work cap. B46
3½" work cap. C9
3½" work cap., Radial W6
4" dia. solid, Submerged, Wet A14
4" cap. E4
4" thick, 22" long, Horizontal, Wet A14
4" thick, 42" long, Horizontal, Wet A14
4" thick, 64" long, Horizontal, Wet A14
4" thick, 20' long, Horizontal, Wet A14
4" cap. solid D12
4" cap. T1
4¼" cap., Radial W6
4½" cap. T1
6" dia. solid, Wet A14
6" cap. E4
6" cap. T1
8" cap. E4
8" dia. solid, Wet A14
9" dia. solid, Rotary, Wet A14
10" wheel, Wet or Dry T3
12" cap. E4
14" dia. solid, Rotary, Wet A14
14" cap. E4
14" wheel, Wet or Dry T3
16" cap. E4
20" wheel T1
Structurals, Sheet & Plate S39
7½-15 hp W22
Plastics, Disk D8

Band Saw Cutoff

3½" cap., Horizontal W14
5" cap., Horizontal W14
5" round, 10" flat J4
5½" dia. rounds, 7" dia. flats, Horizontal, Bench C50
6" x 6" vise cap., Gravity Feed L2
6" x 18" cap., Horizontal K1
6" dia. or 6" x 12" rect. F1
8" cap., Horizontal W14
8" x 10" vise cap., Gravity Feed L2
8" x 10" vise cap., Hydraulic Feed L2
8" x 16" cap., Horizontal K1
8" x 24" cap., Horizontal K1
8¾" throat, 8¾" work thickness R17
9" x 16" cap. I1
9" x 16" cap., Horizontal, Hinge-Type W15
9" x 18" cap., Horizontal W15
9" x 20" cap. I1
10" round, 18" flat J4
10" x 19½" throat depth, Manual Feed L2
12" x 12" vise cap., Gravity Feed L2
12" x 18" vise cap., Gravity Feed L2
12" throat, 20" work thickness, Horizontal D17
12" x 20" cap., Horizontal K1
12" throat, Bench W6
12¾" cap., Horizontal W14
13½" throat, Bench B33
13½" throat, Floor B33
14" x 14" work table, Upright D6
14" throat, Pedestal W6
14" x 18" cap., Horizontal W15
16" x 12" vise cap., Hydraulic Feed L2
16" throat, Bench W6
16" throat, Pedestal W6
18" x 18" work cap. A19
18" x 29½" throat depth, Manual Feed L2
18" x 40" vise cap., Hydraulic Feed L2
20" cap. Special, Horizontal W14
24" x 24" cap., Horizontal W15
24" x 48" vise cap., Hydraulic Feed L2
36" cap D6
36" cap., Sprue cutting D6

Friction Saw

16" throat, 10" work thickness D17
21½" dia. blade K12
26" throat, 13" work thickness D17
36" throat, 13" work thickness D17
36" throat, 19" vert. cap. T3
36" throat, 20" work thickness D17
42" throat, 21" vert. cap. T3
46" dia. blade K12
48" dia. blade K12
52" dia. blade K12
56" dia. blade K12
58" dia. blade K12
60" throat, 13" work thickness D17
60" dia. blade K12
61" dia. blade K12

Lathe Type Cutoff

⅝" dia. bar, Screw Machine, Auto., Horizontal, Single Spindle B44
⅝" dia. bar P23
2" dia. tubing, 1½" pipe 1½" dia. bar B7
2" dia. to 0" M30
2¼" dia. to 0" Manual Operation M30
3" dia. tubing, 2½" pipe 2¼" dia. bar B7
3" dia. to ¼" M30
3¼" to ¼", Manual Operation M30
4" dia. tubing, 3½" pipe 3" dia. bar B7
4¼" dia. to 1½" M30
4⅝" dia. to 2", Manual Operation M30
5¼" pipe B7
5⅝" dia. to 2", Manual Operation M30
6" pipe, 4½" dia. bar B7
6¾" dia. to 2½" M30
8" pipe, 6" dia. bar B7
9" pipe B7
12" pipe B7
16" dia. pipe & tubing B7
26" dia. pipe & tubing B7

Pipe Cutoff

⅛" to 3" dia. pipe, Pipe and Tube C37
⅛" to 6" dia. pipe, Pipe and Tube C37
¼" to 2" pipe, Bench Type O5
¼" to 2" pipe, Floor Type O5
½" to 2" dia. L4
1" to 4" pipe, Floor Type O5
1" to 6" pipe, Floor Type O5
1½" to 4" dia. L4
2" dia. tube, Tube, Horiz. Floor C44
2" dia. M39
2" to 4½" pipe, Coupling S29
2" to 4½" pipe, Flying S29
2½" to 8" pipe, Floor Type O5
3" dia. tube, Tube A1
3" dia. pipe T5
3" to 12" dia. pipe, Pipe and Tube C37
3½" to 6" dia. L4
4" pipe H21
4" dia. tube, Tube, Horiz., Floor C44
4" dia. M39
4" dia., Tube T13
4½" to 8⅝" pipe, Coupling S29
4½" to 8⅝" pipe, Flying S29
6" dia. tube Tube A1
6" dia. tube, Tube, Horiz., Floor C44
6⅝" dia. pipe T5
7" pipe H21
8⅝" dia. pipe T5
8⅝" to 13⅜" pipe, Coupling S29
8⅝" to 16" pipe, Flying S29
9" dia. tube, Tube A1
9" dia. tube, Tube, Horiz., Floor C44
12⅜" dia. tube, Tube A1
14" dia. pipe T5
20" dia. pipe T5
24" dia. tube, Tube, Horiz., Floor C44

Contour Sawing & Filing Machines

Contour Band Sawing

8⅜" throat, 8¾" work thickness R17
13½" throat H17
14" cap. H18
15⅜" throat, 12⅛" work thickness D17
16" cap., Sawing Machine, Contour, Band Metal Cutting D20
24" throat H17
27" x 36" table, 24" swing throat R9
29½" throat T17
30" cap. Y1
36" throat, 20" work thickness D17
36" cap. Y1

Combination Contour Band Sawing & Filing

⅛-½" width files, 1½" stroke, 2 and 4 speeds, Combination Filing, Sawing, and Lapping R8
13½" throat B33
15⅜" throat, 12⅛" work thickness D17
16" throat, 10" work thickness D17
24" throat, 11" vertical cap. T3
26" throat, 13" work thickness D17
36" throat, 12½" vertical cap. T3
36" throat, 13" work thickness D17
36" throat, 20" work thickness D17
48" throat, 12½" vertical cap. T3
60" throat, 13" work thickness D17

Ram Type Filing

1½" stroke C55
1⅝" stroke, Die Filing I-2
5" stroke, 10¾" throat, Combination Ram Type Sawing & Filing C35
8⅜" x 8¾", Die Making I-1
10" x 10" table, Punch & Die Making I-1

Circular Saw Filing

Filing Machine, Rotary R5

Band Saw Filing

¼" to 3" blades H6
1" material O2
1⅜" stroke H11
1½" width saw B24
1⅜" stroke H11
1⅜" stroke H11
2" stroke H11
2½" width saw B24
3" material O2
16" throat, 7" work thickness D17

Scroll & Jig Sawing

14" x 142" table, Scroll D6
20" cap., Scroll Y1
24" throat, 27" x 36" table, Jig and Drilling Machine R9
24" throat, 27" x 36" table, Jig, Drill and Contour Saw Combination R9
24" throat, Jig W6
30" throat, 32" x 42" table, Jig and Drilling Machine R9
30" throat, 32" x 42" table, Jig, Drill & Contour Saw Combination R9
50" throat, 42" x 52" table, Jig and Drilling Machine R9
50" throat, 42" x 52" table, Jig, Drill & Contour Saw Combination R9

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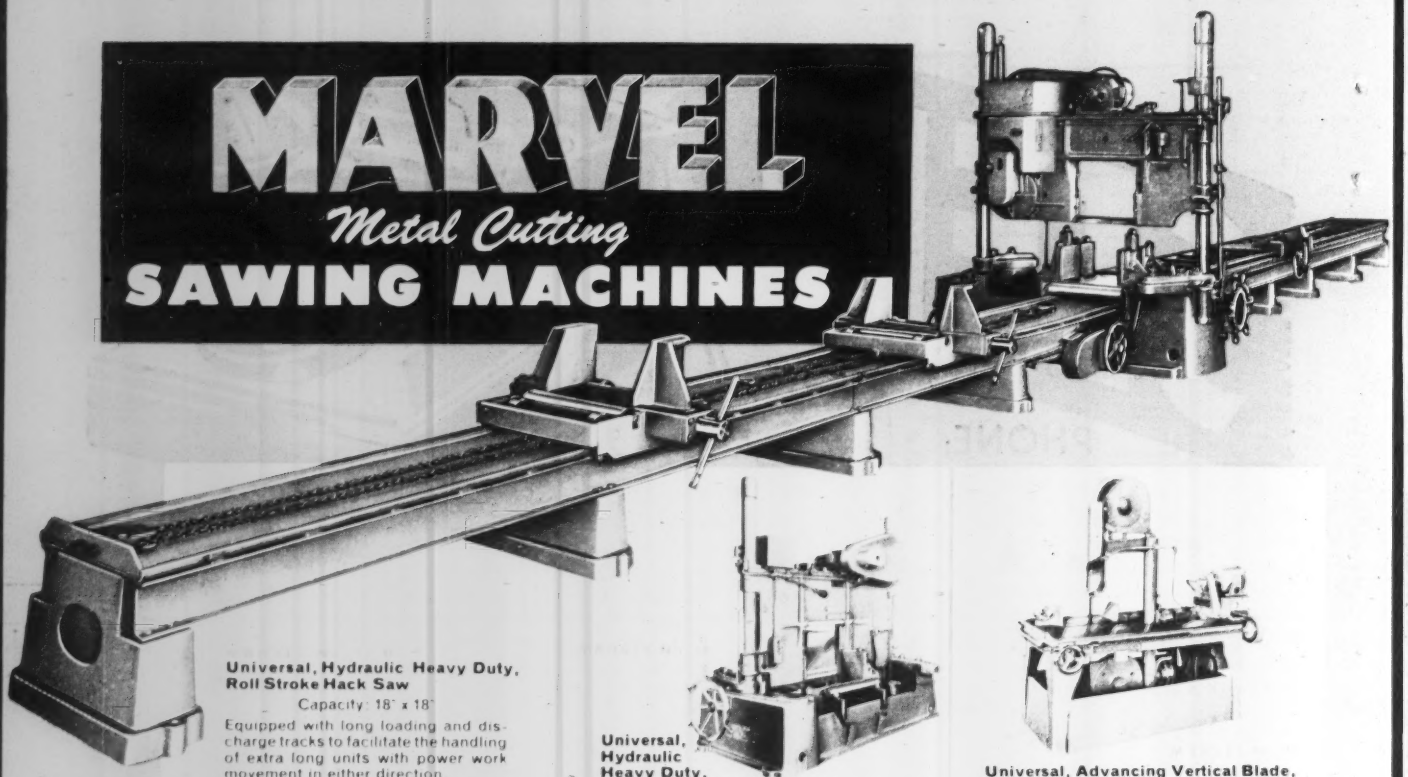
MARVEL

Metal Cutting SAWING MACHINES



Universal, Hydraulic Heavy Duty, Roll Stroke Hack Saw

Capacity: 18" x 18"

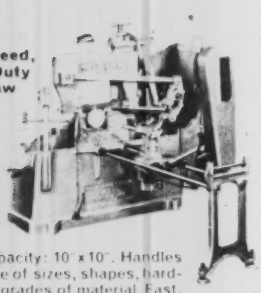
Equipped with long loading and discharge tracks to facilitate the handling of extra long units with power work movement in either direction.

Universal, Hydraulic Heavy Duty, Roll Stroke Hack Saw

Capacity: 24" x 24"

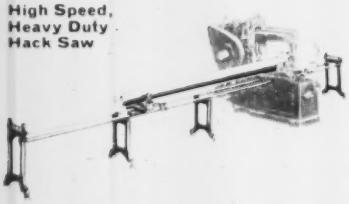
Universal, Advancing Vertical Blade, Band Sawing Machine

Capacity: 18" x 18" (cuts angles 0 to 45° right, 0 to 45° left).



High Speed, Heavy Duty Hack Saw

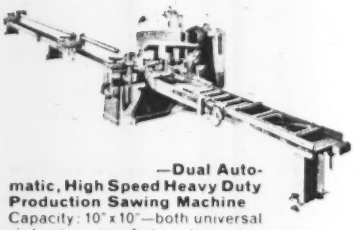
Capacity: 10" x 10". Handles wide range of sizes, shapes, hardness and grades of material. Fast, accurate, economical.



High Speed, Heavy Duty Hack Saw

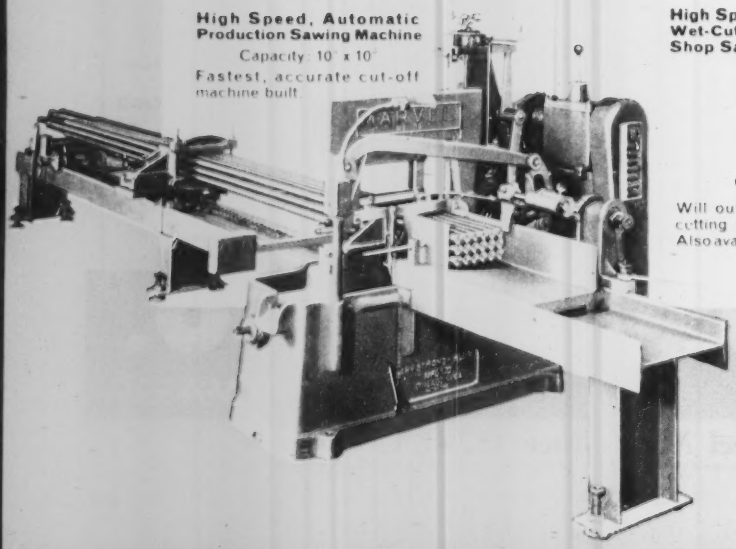
Capacity: 6" x 6"

With standard work track which provides permanently aligned support of long work.



—Dual Automatic, High Speed Heavy Duty Production Sawing Machine

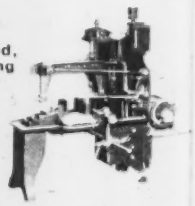
Capacity: 10" x 10"—both universal and automatic. Automatic operation can be interrupted for occasional cut, and re-established without loss of set-up.



High Speed, Automatic Production Sawing Machine

Capacity: 10" x 10"

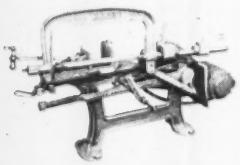
Fastest, accurate cut-off machine built.



High Speed, Wet-Cutting Shop Saw

Capacity: 6" x 6"

Will out-cut any other metal-cutting saw in its price class. Also available with cabinet base.



Dry-Cutting, Light Duty Shop Saw

Capacity: 6" x 6"

Dependable, low priced hack saw. Also available in 4" x 4" capacity.

Modifications and special accessory equipment available for each model provide a most advanced, modern, complete line of efficient metal-cutting saws to exactly suit every individual sawing need. Your local MARVEL metal sawing engineer is competent to study your cut-off and metal sawing problems, and to make recommendations as to proper methods and equipment.

MARVEL *High-Speed-Edge* Hack Saw Blades

Invented by MARVEL, the unbreakable, composite blade (with high speed steel edge integrally welded to a tough unbreakable body) is universally recognized as the fastest cutting, longest lasting type of hack saw blade yet developed. MARVEL high-speed-edge hack saw blades are unequalled, because they embody the superiority and uniform excellence attained through thirty years of pioneering leadership through the invention and perfection of composite blade design and of methods and machinery for their closely controlled manufacture. "Know-how" cannot be copied!

High-Speed-Edge HACK SAW BLADES

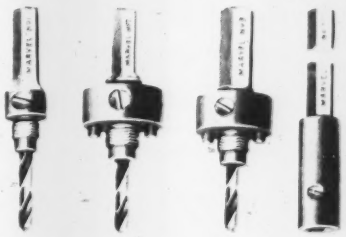
Cut faster. Last longer. Unbreakable, shatterproof, and safe.

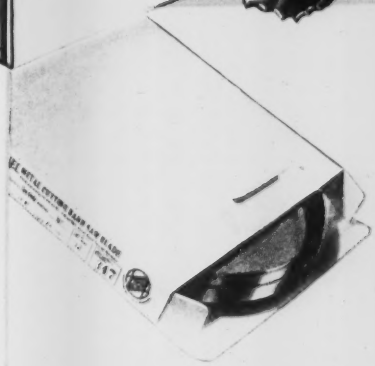
The finest obtainable cutting edge is integrally welded to a tough unbreakable alloy steel body. Improved design assures maximum tooth contact at all times. Hardened "eyes" permit tauter tensioning—increase accuracy. Permit operation of any hack sawing machine at maximum speed and feed. Reduce metal sawing costs materially.

Sizes for all hack sawing machines, in lengths from 12" to 36", with from 2-1 2 to 18 teeth per inch. Boxed 10 blades to the box. Carried in stock by leading industrial distributors everywhere.

High-Speed-Edge HOLE SAWS

Incorporating the MARVEL High-Speed-Edge principle, the heavy duty hole saws provide an entirely new method for cutting-out large holes at low cost in steel to 1-1 8" thickness. They have the needed strength for lathe and drill press use as well as for use in portable electric drills. Greatly increases hole cutting capacity of small machine tools. Heavy arbors with high speed pilot drills; drive self-centering. 35 sizes to cut holes from 5 8" to 4-1 2" dia. in any machinable material. Carried in stock by industrial distributors.





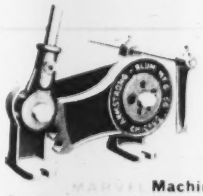
Metal-Cutting Band Saw Blades

MARVEL Band Saw Blades come ready for use, welded to size for every standard make metal-cutting band saw machine. Each is individually boxed—comes to you free from rust, kinks or marring. Each is properly labeled with size, tooth pitch and stock number to assure the proper blade for each machine, material and type of work.

To save time and assure high performance and long blade life, specify MARVEL Band Saw Blades when ordering from your supplier.

Heavy-Duty Hand Hack Saw Frame

Correctly designed to permit full utilization of faster cutting MARVEL High-Speed-Edge unbreakable Hack Saw Blades. Rigid 1-piece, hot forged, heat treated aluminum alloy. Grips and blade rotate to 8 positions. Takes 12" blade.

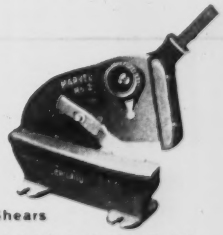


Rod Cutter

Cuts off round bars, rods or wire with single stroke of hand lever. 3 sizes: 3 8" to 1 8", 5 8" to 3 8", or 7 8" to 3 8".

Machine Vises

Quick-action (sliding ratchet and screw) for drill presses, milling machines and shapers. Two sizes: 5" or 8"

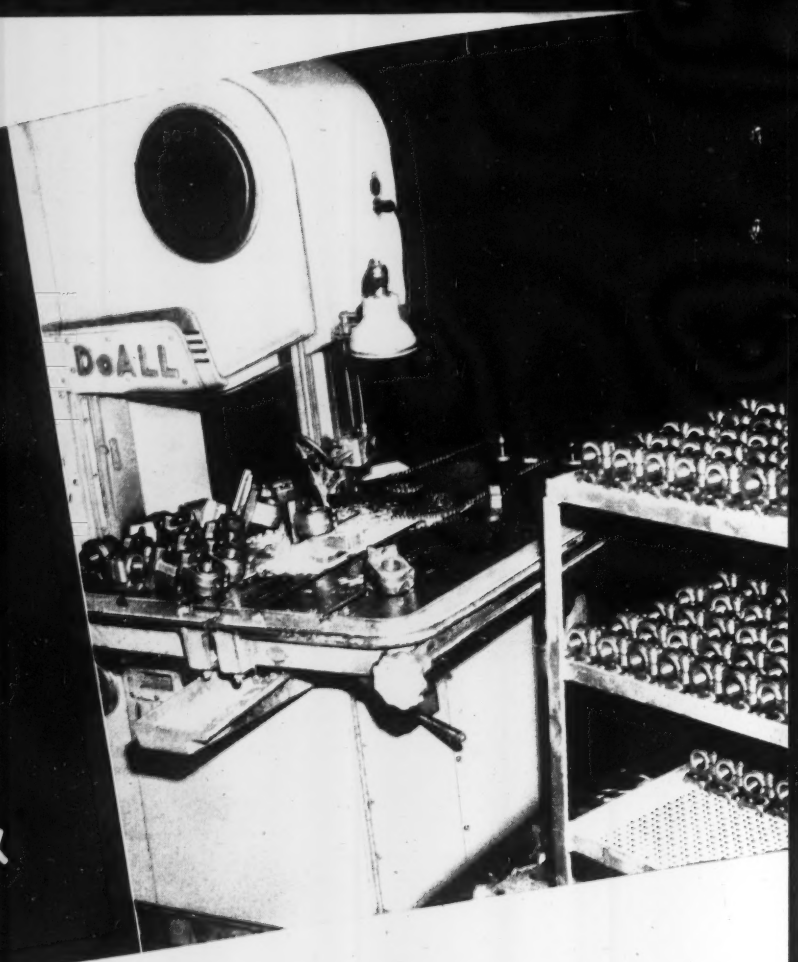


Splitting Shears

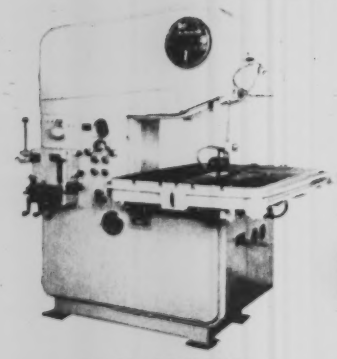
Accurately cut-off, split or trim flat steel plates and bars. Smooth shearing action. Adjustable stripper. 2 sizes, capacities: 1 8" or 1 4" mild steel.

ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U. S. A.

The Band Machine is as Basic as the Lathe ... for production Work

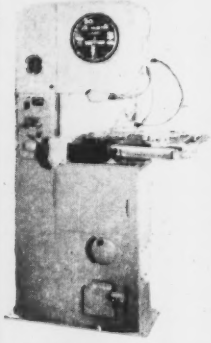


A BAND MACHINE FOR EVERY REQUIREMENT

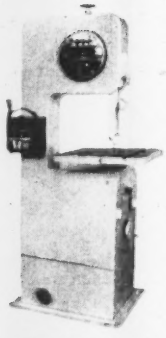


DoALL CONTOUR-MATIC—hydraulic operation. 40 to 10,000 blade feet per minute.

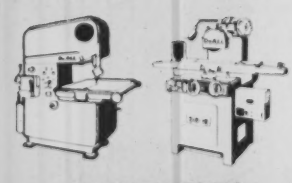
DoALL ZEPHYR—up to 15,000 feet per minute. 16" to 60" throat capacity.



DoALL CONTOUR—an all around machine for precision work.



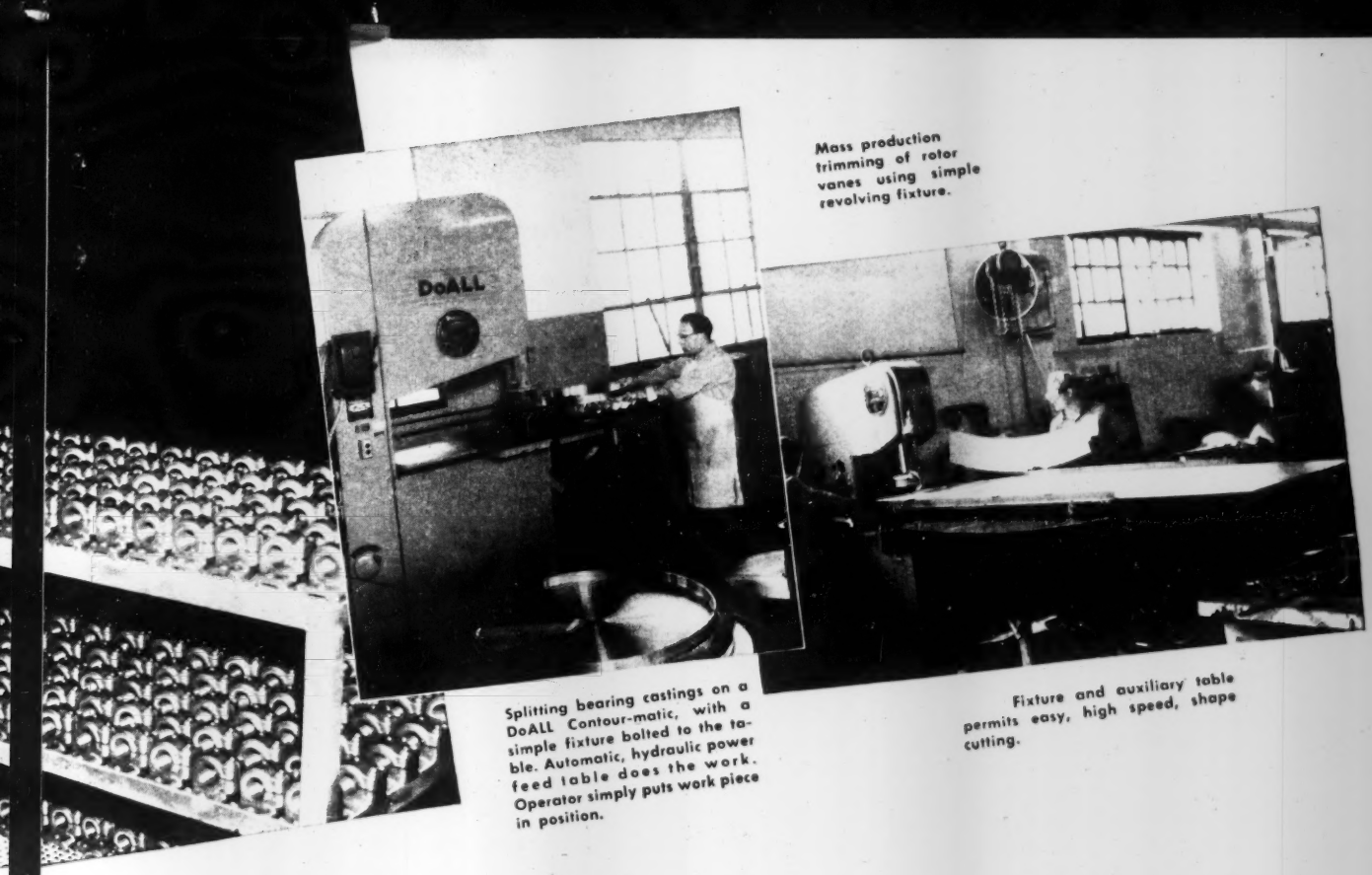
DoALL UTILITY—low cost handyman for big and small shops.



MACHINE TOOLS

CUTTING TOOLS

GAGING EQUIPMENT



Mass production trimming of rotor vanes using simple revolving fixture.

Splitting bearing castings on a DoALL Contour-matic, with a simple fixture bolted to the table. Automatic, hydraulic power feed table does the work. Operator simply puts work piece in position.

Fixture and auxiliary table permits easy, high speed, shape cutting.

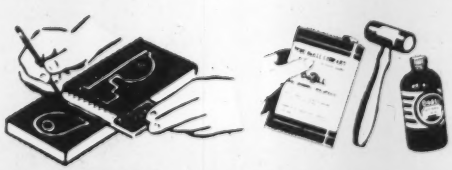
PRODUCTION costs are highly dependent on methods. Mass production band machining is a work method that has cut costs in hundreds of plants and very possibly can in yours. Slitting—slotting—stock removal prior to milling, shaping, turning and other operations—contour sawing to final shape and many other jobs can be performed almost automatically on DoALL machines with proper fixtures.

The above illustrations show three typical applications of production bandsawing. The opportunities are limited only by the ingenuity of the user.

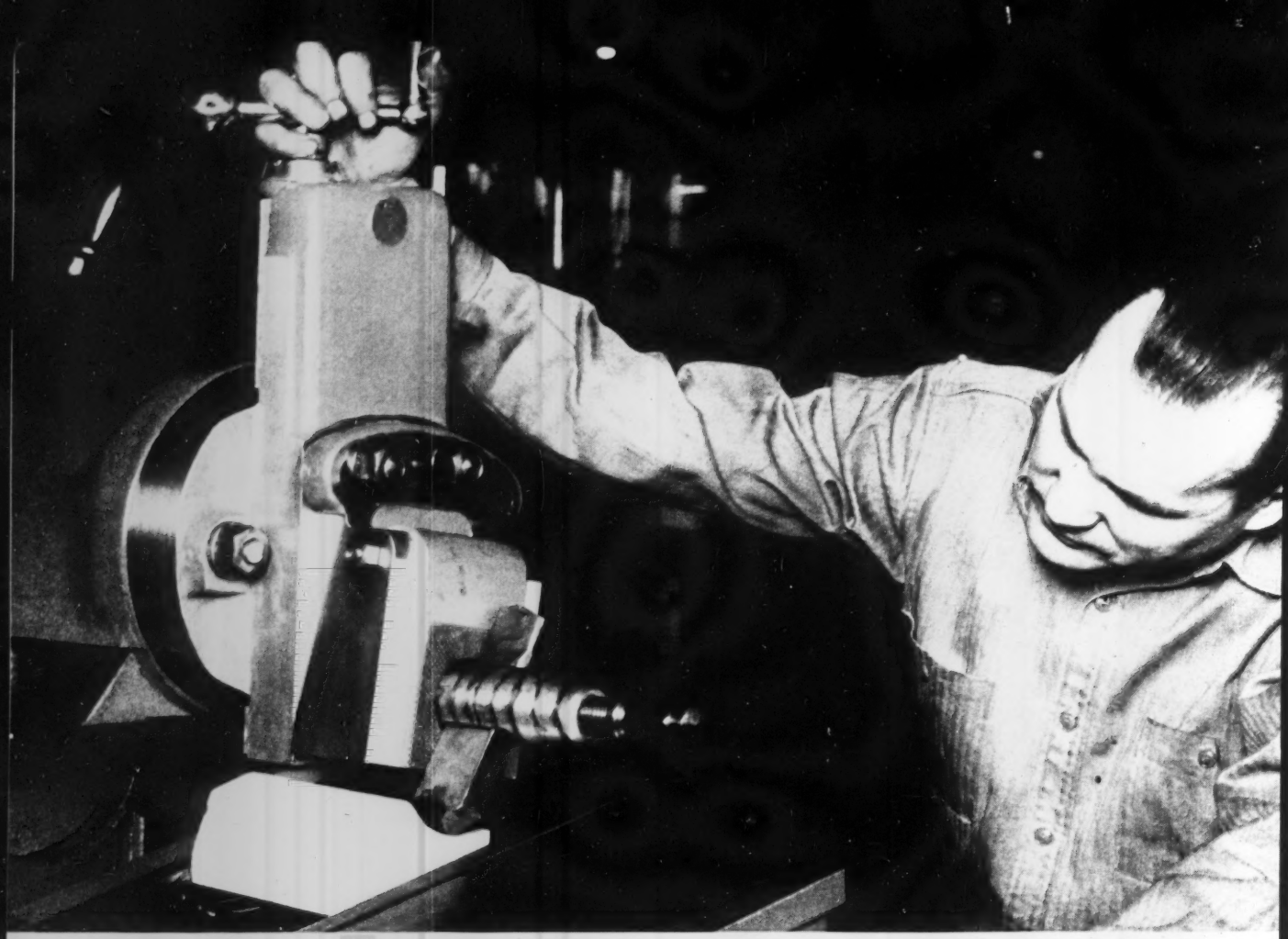
To lower costs, investigate bandsawing. ASK FOR LITERATURE. Call your local DoALL Sales-Service Store, or write: B-19 1

THE DoALL COMPANY

254 N. Laurel Ave., Des Plaines, Illinois



INDUSTRIAL SUPPLIES



MANUFACTURERS IN THIS SECTION

Atlas Press Co.—A21
Cincinnati Shaper Co.—C14
Consolidated Machine Tool Corp.
Div. of Farrel Birmingham Co.—C36
Cedar-West Machine Co.—C55
Delta Tool Div.
Rockwell Mfg. Co.—D6
Gemco Shaper Co.—G6
Gould & Eberhardt Inc.—G16
Havir Mfg. Co.—H12
Hendey Machine Co.—H15
Hess Machine Works—H17
Jackson Hydraulic Machine Co. Inc.—J1
Lobdell United Co.—L25
Logan Engineering Co.—L27
Mesta Machine Co.—M18
Morey Machinery Co. Inc.—M34
Morton Mfg. Co.—M36
Ohio Machine Tool Co.—O1
Pratt & Whitney Div.
Niles-Bement-Pond Co.—P17
Rockford Machine Tool Co.—R14
Sheldon Machine Co.—S10
Smith & Mills Co.—S21
South Bend Lathe Works—S25
Western Machine Tool Works—W16

SECTION 10

Shapers and Slotters

Horizontal Mechanical Plain

6" to 7" stroke, Shaper, Bench S25
7" stroke, Bench A21
7¾" stroke, Bench I16
8½" stroke L27
12" stroke H15
12" stroke, Swivel Table S10
12" stroke W16
12½" stroke, Slotter, Traveling Head L25
14" stroke G16
14" stroke W16
15" stroke W16
16" stroke C14
16" stroke G6
16" stroke G16
16" stroke H15
16" stroke O1
16" stroke W16
16" to 36" stroke S21
18½" stroke, Slotter, Traveling Head L25
20" stroke C14
20" stroke G6
20" stroke G16
20" stroke H15
20" stroke O1
20" stroke W16
21" stroke C14
24" stroke G6
24" stroke G16
24" stroke O1
24" stroke W16
25" stroke, Slotter, Traveling Head L25
28" stroke C14
28" stroke G6
28" stroke G16
28" stroke O1
32" stroke C14
32" stroke Shaper, Railroad C14
32" stroke G6
32" stroke G16
32" stroke O1
36" stroke C14
36" stroke G6
36" stroke G16
36" stroke Shaper, Railroad C14
36" stroke O1
8' to 10' stroke M18

Horizontal Mechanical Universal

8" stroke H12
12" stroke H15
12" stroke W16
12½" stroke, Slotter, Traveling Head L25
14" stroke G16
14" stroke W16
15" stroke W16
16" stroke C14
16" stroke G6
16" stroke G16
16" stroke H15
16" stroke O1
16" stroke W16
18½" stroke, Slotter, Traveling Head L25
20" stroke C14
20" stroke G6
20" stroke G16
20" stroke H15
20" stroke O1
20" stroke W16
21" stroke C14
21" stroke G6
24" stroke G16
24" stroke O1
24" stroke W16
25" stroke Slotter, Traveling Head L25
28" stroke C14
28" stroke G6
28" stroke G16
28" stroke O1
32" stroke C14
32" stroke G6
32" stroke G16
32" stroke O1
36" stroke C14
36" stroke G6
36" stroke G16
36" stroke O1
Special S21

Horizontal Hydraulic

16" stroke R14
20" stroke R14
24" special stroke R14
24" special R14
24" heavy duty R14
28" stroke R14
36" stroke, Openside R14
48" stroke, Openside R14
60" stroke, Openside R14
72" stroke, Openside R14

Horizontal Draw Cut

18" to 72" stroke, Slotter M36
38" stroke, Railroad M36
48" stroke, Railroad M36
60" stroke, Railroad M36

Vertical Mechanical

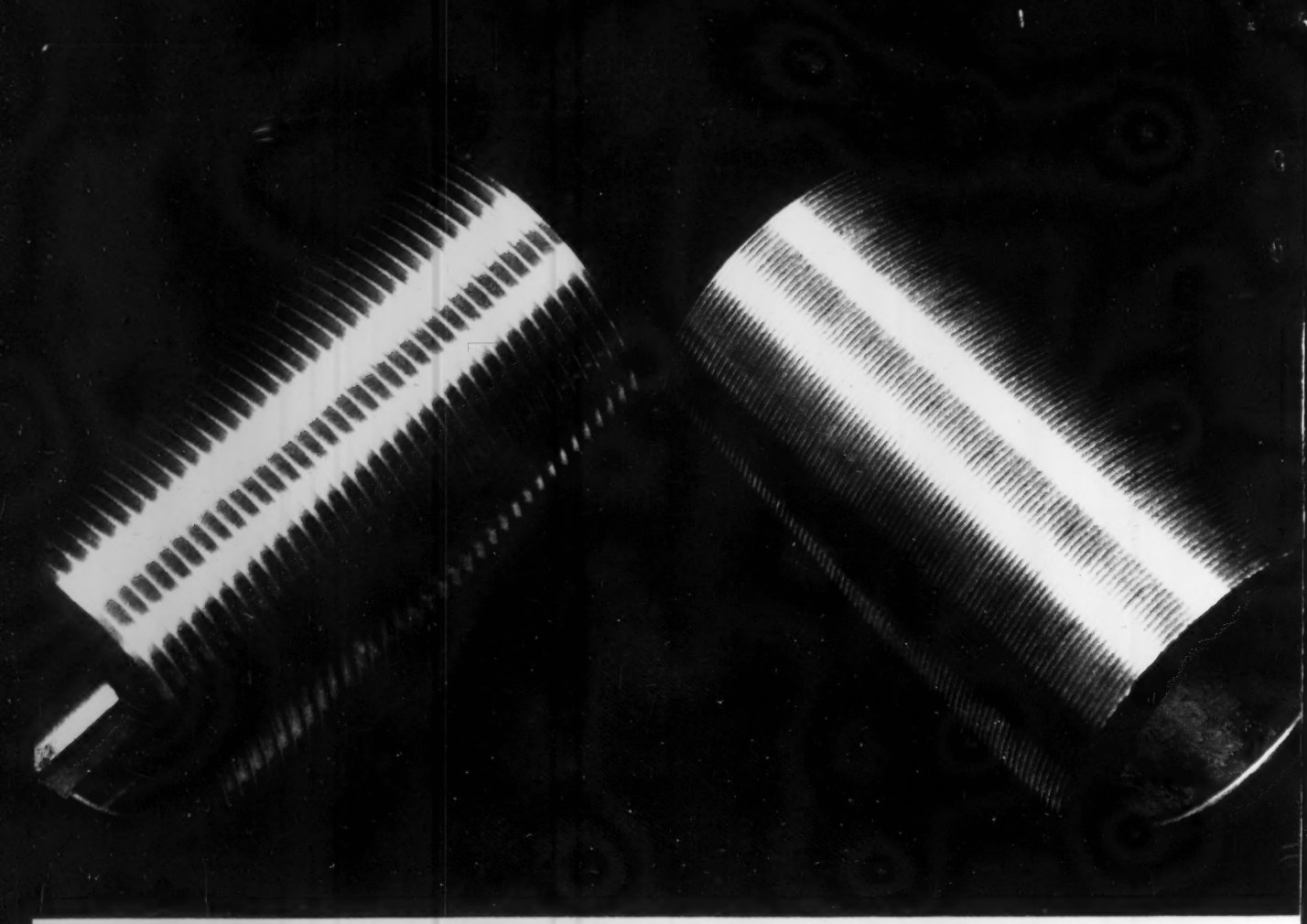
6" stroke, Rotary Table P17
8" x 8" width, Punch & Form C66
12" stroke, Rotary Table P17
12½" stroke, Slotter, Traveling Head L25
14" stroke M24
18½" stroke, Slotter, Traveling Head L25
24" stroke, 4" to 21" dia Slotter, Radius 41
26" stroke, Slotter, Traveling Head L25

Vertical Hydraulic

12" stroke, Slotter R14
20" stroke, Slotter R14
36" stroke, Slotter R14
48" stroke, Slotter R14

Shapers & Slotters Not Elsewhere Classified

¾" width H17
2" width H17
4" width H17
8" width H17
Special, Crank Slotters G36
Special, Locomotive Frame Slotters G36
Special, Worm and Rack Driven Slotters G36



MANUFACTURERS IN THIS SECTION

SECTION 11

Tapping and Threading Machines

Acme Machinery Div., Hill Acme Co.—A4
Charles G. Allen Co.—A12
Baush Machine Tool Co.—B12
Beaver Pipe Tools Inc.—B13
Bignall & Keeler—B20
The Bodine Corp.—B31
Boice Crane Co.—B33
Buffalo Forge Co.—B47
Cleereman Machine Tool Co.—C18
Cleveland Automatic Machine Co.—C20
Cleveland Tapping Machine Co.—C27
Cox & Sons Co.—C44
Davis & Thompson Co.—D5
Eastern Machine Screw Corp.—E1
Economy Engineering Co.—E2
Ettco Tool Co. Inc.—E18
Fox Engineering Co.—F14
Frew Machine Co.—F19
Grant Mfg. & Machine Co.—G19
Hamilton Tool Co.—H4
Hartford Special Machinery Co.—H10
Hole Engineering Service—H25
Kaufman Mfg. Co.—K2
Kent Machine Co.—K8
Landis Machine Co.—L4
Lees-Bradner Co.—L13
Leffler Machinery & Die Co. Inc.—L14
Magna Engineering Corp.—M2
Murchey Div. of Sheffield Corp.—M39
National Acme Co.—N1
National Automatic Tool Co. Inc.—N2
National Machinery Co.—N5
Oster Mfg. Co.—O5
Peerless Machine Co.—P4
Pines Engineering Co. Inc.—P8
Pipe Machinery Co.—P9
Pottstown Machine Co.—P16
Procunier Safety Chuck Co.—P20
D. H. Prutton Machinery Co.—P26
Reed Rolled Thread Die Co.—R4
Rehnberg-Jacobson Mfg. Co.—R5
Rickert-Shafer Co.—R10
Saunders Mfg. Co.—S2
Sloan & Chace Mfg. Co. Inc.—S20
Snow Mfg. Co.—S22
William K. Stamets Co.—S29
Steinle Machine Co.—S46
Taylor-Wilson Mfg. Co.—T5
H. P. Townsend Mfg. Co.—T14
Warner & Swasey Co.—W9
Waterbury Farrel Foundry & Machine Co.—W10
Watson-Flagg Machine Co.—W12
Western Machine Tool Works—W16

TAPPING AND THREADING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Tapping Machines

Vertical Standard

#2 through #10 tap ... S22
#6 through 5/16" tap ... S22
#10 through 1/2" tap ... S22
10-24 cap., 7½" swing ... H4
10-24 tap, 8½" swing, Tapping & Threading ... W9
1/16" dia. tap ... S20
1/8" tap cap ... P20
1/4" cap., Tapping Machine ... T14
1/4" cap., 15" swing, Bench Type ... B33
1/4" cap., 15" swing, Floor Type ... B33
1/4" dia. tap ... R10
1/4" through 3/8" tap ... S22
5/16" cap., 16" swing, Bench ... A12
5/16" cap., 16" swing, Floor ... A12
3/8" cap., 16" swing, 2 spindle, Bench ... A12
3/8" cap., 16" swing, 2 spindle, Floor ... A12
3/8" cap., 16" swing, 3 spindle, Bench ... A12
3/8" cap., 16" swing, 3 spindle, Floor ... A12
3/8" cap., 16" swing, 4 spindle, Bench ... A12
3/8" cap., 16" swing, 4 spindle, Floor ... A12
3/8" cap., 16" swing, 5 spindle, Bench ... A12
3/8" cap., 16" swing, 5 spindle, Floor ... A12
3/8" cap., 16" swing, 6 spindle, Bench ... A12
3/8" cap., 16" swing, 6 spindle, Floor ... A12
7/16" cap., 24" swing, Bench ... A12
7/16" cap., 24" swing, Floor ... A12
7/16" cap., 24" swing, 2 spindle, Bench ... A12
7/16" cap., 24" swing, 2 spindle, Floor ... A12
7/16" cap., 24" swing, 3 spindle, Bench ... A12
7/16" cap., 24" swing, 3 spindle, Floor ... A12
7/16" cap., 24" swing, 4 spindle, Floor ... A12
7/16" cap., 24" swing, 5 spindle, Floor ... A12
7/16" cap., 24" swing, 6 spindle, Floor ... A12
7/16" tap cap ... P20
1/2" cap., 15" swing, Round Column, Floor ... B47
1/2" to 3/4", 3 spindle ... P26
7/16" tap cap., 4 spindle, Automatic Feed ... R5
1/2" dia. tap ... C27
1/2" cap., 15" swing, Bench Type ... B33
1/2" cap., 15" swing, Floor Type ... B33
1/2" cap., 15" swing, Round Column, Floor ... B47
1/2" dia. tap ... F19
1/2" in steel, 2" stroke, Lead Screw ... H25
5/8" dia. tap ... P20
5/8" dia. tap ... R10
5/8" dia. tap ... W16
5/8" dia. tap ... C27
5/8" cap ... E18
5/8" tap, 8½" swing, Tapping & Threading ... W9
5/8" to 1¼", 3 spindle ... P26
1" dia. tap ... C27
1" dia. tap ... F19
1" tap ... K2
1" tap ... W16
1¼" tap ... W16
1½" tap ... K2
1½" to 4", 3 spindle ... P26
1¾" tap ... W16
1⅞" dia. tap ... C27
2½" tap, 15½" swing, Tapping & Threading ... W9
2¾" dia. tap ... C27
3" tap ... W16
24" swing, 3, 5 and 7½ hp ... C18
30" swing, 3, 5 and 7½ hp ... C18
1 hp ... M2

Vertical Multiple Spindle

⅛" tap, 2 spindle ... W16
⅛" tap, 2 spindle, Tapping & Drilling ... W16
⅛" tap, 3 spindle ... W16
⅛" tap, 3 spindle, Tapping & Drilling ... W16
5/16" cap. ... E18
3/8" tap, 2 spindle ... K2
1" tap, 2 spindle ... W16
1" tap, 2 spindle, Tapping & Drilling ... W16
1" tap, 3 spindle ... W16
1" tap, 3 spindle, Tapping & Drilling ... W16
1¼" tap, 2 spindle ... K2
1¼" tap, 2 spindle ... W16
1¼" pipe, 3 spindle ... K2
1¼" tap, 2 spindle ... W16
1¼" tap, 3 spindle ... W16
2" pipe, 2 spindle ... K2
2" tap, 2 spindle ... W16
2 spindle combination ... W16
4 spindle, Drilling, Tapping, Automatic Dial Type ... B31
6 spindle, Drilling, Tapping, Automatic Dial Type ... B31
8 spindle, Drilling, Tapping, Automatic Dial Type ... B31
12 spindle ... B12
1 hp ... M2
10 to 15 hp ... B12

Horizontal

1/16" dia. tap, Bench ... R10
1/16" dia. tap, Column ... R10
1/8" dia. tap, Bench ... R10
1/8" dia. tap, Column ... R10
1/8" dia. tap, Pedestal ... R10
1/4" dia. tap, Bench ... R10
1/4" dia. tap, Column ... R10
5/16" dia. tap, Bench ... R10
5/16" dia. tap, Column ... W16
1/2" tap, 2 spindle ... F14
¾ hp ... M2
1 hp ... B12
2 to 5 hp each head, Three Way ... F14
3 hp ... F14
3 hp, Way Type ... B12
3 to 7½ hp, Combination ... F14
10 hp, Way Type ... F14
15 hp, Way Type ... N2
Special

Radial Arm

3/8" steel, 4" stroke ... H25
7/8" tap, 36" swing ... W9
½ hp, 42" swing ... B12

Nut Tappers

#0 through #6 tap ... S22
#6 through #10 tap ... S22
#10 through 5/16" tap ... S22
1/4" dia. ... N5
5/16" dia. ... N5
3/8" dia. ... N5
7/16" through 1/2" tap ... S22
7/16" dia. ... N5
1/2" dia. tap ... W10
1/2" dia., 4 spindle ... B31
1/2" dia. ... N5
1/2" dia., 4 spindle ... B31
1/2" through 1" tap ... S22
9/16" dia. tap ... W10
5/8" dia. ... N5
3/4" dia. ... N5
7/8" dia. ... N5
7/8" dia. tap ... W10
1" tap cap., Semiautomatic, 6 spindle ... A4
1" tap cap., Semiautomatic, 8 spindle ... A4
1" dia. ... N5
1" dia., 6 & 8 spindle ... N5
1¼" dia. ... N5
1⅜" dia. ... N5
1½" dia., 6 & 10 spindle ... N5
2" tap cap., Semiautomatic, 6 spindle ... A4
2" tap cap., Semiautomatic, 8 spindle ... A4
2" dia., 6 & 12 spindle ... N5
2" dia., 12 spindle ... N5

Shell Tappers

75 mm to 155 mm ... L4
155 mm to 240 mm ... L4

Coupling Tappers

1" pipe tap, 3 spindle, Pipe Fittings ... C27
1" pipe tap, 4 spindle, Pipe Fittings ... C27
1" tap cap., 6 spindle, Semiautomatic ... A4
1" tap cap., 8 spindle, Semiautomatic ... A4
2" pipe tap, 3 spindle, Pipe Fittings ... C27
2" pipe tap, 4 spindle, Pipe Fittings ... C27
2" tap cap., 6 spindle, Semiautomatic ... A4
2" tap cap., 8 spindle, Semiautomatic ... A4
2" to 4½" pipe ... S29
4" tap cap., 4 spindle, Semiautomatic ... A4
4" tap cap., 6 spindle, Semiautomatic ... A4
4½" dia. single spindle, Tapping & Boring ... N1
4½" to 8⅝" pipe ... S29
8⅝" to 13⅜" pipe ... S29
Single & Multiple Spindles ... T5

Threading Machines

Bolt, Rotary Die Type

⅜" to ⅝" dia. ... L4
⅜" to ⅝" dia. ... L4
⅜" to ⅝" dia., Two Spindle ... L4
¼" to ⅜" dia. ... L4
¼" to ½" dia. ... L4
¼" to ½" dia., Two Spindle ... L4
¼" to ⅝" dia., Two Spindle ... L4
¼" to ¾" dia. ... L4
¼" to ¾" dia., Two Spindle ... L4
¼" to ⅞" dia. ... L4
¼" to ⅞" dia., Two Spindle ... L4
¼" to 1" dia. ... L4
¼" to 1" dia., Two Spindle ... L4
¼" to 1" dia., Three Spindle ... L4
¼" to 1" dia., Four Spindle ... L4
¼" to 1¼" bolt, ⅛" to 1¼" pipe, Bench Type ... O5
¼" to 1¼" bolt, ⅛" to 1¼" pipe, Floor Type ... O5
¼" to 1¼" bolt, ¼" to 2" pipe, Bench Type ... O5
¼" to 1¼" bolt, ¼" to 2" pipe, Floor Type ... O5
½" dia. ... K5
½" to 1½" dia. ... L4
½" to 1½" dia., Two Spindle ... L4
½" to 1½" dia., Three Spindle ... L4
½" to 1½" spindle, Four Spindle ... L4
½" to 2" dia. ... L4
½" to 2" dia., Two Spindle ... L4
⅝" to 2" dia., Three Spindle ... L4
⅝" to 2½" dia. ... L4
⅝" to 2½" dia., Two Spindle ... L4
⅝" dia. ... S22
¾" dia. ... E1
¾" dia., Four Spindle ... E2
⅞" dia. ... K5
1" dia. ... S22
1" dia., Two Spindle ... K5
1" dia. ... M39
1" dia., Two Spindle ... M39
1¼" dia. ... M39
1¼" dia., Two Spindle ... M39
1½" to 6" dia. ... L4

Bolt, Leadscrew Type

⅛" to 2" bolt, ¼" to 2" pipe ... O5
1¼" dia. ... M39
4" dia. ... M39

Pipe Threading & Cutoff

⅛" to 2" dia. ... L4
¼" to 2" dia. pipe ... O5
⅛" to 2" dia. ... L4
⅛" to 4" dia. ... L4
2" to 4" dia. pipe ... O5
1¼" to 6" dia. pipe ... O5
1½" to 4½" dia. ... L4
4" to 6" dia. ... L4
4" to 6" dia. pipe ... O5
2" dia. pipe, Single End, Horiz., Floor ... C44
2" dia. pipe ... O5
2" dia. pipe ... S2
2" dia. pipe, 6 spindle ... D5
2½" to 8" dia. pipe ... L4
2½" to 8" dia. pipe ... O5
2½" to 8⅝" dia. ... L4
3" dia. pipe, Single End, Horiz., Floor ... C44
3" dia. pipe ... S2
4" dia. pipe ... B20
4" dia. pipe, Single End, Horiz., Floor ... C44
4" dia. pipe ... S2
4" dia. pipe, 6 spindle ... D5
4" to 12" dia. ... L4
4½" to 10" dia. ... L4
4½" to 13⅜" dia. ... L4
6" dia. pipe ... B20
6" dia. pipe, Single End, Horiz., Floor ... C44
6" dia. pipe ... S2
8" dia. pipe ... B20
8" dia. pipe, Single End, Horiz., Floor ... C44
8" dia. pipe ... S2
8" to 16" dia. ... L4
8" to 18" dia. ... L4
10" dia. pipe ... S2
10" to 20" dia. ... L4
12" dia. pipe ... B20
12" dia. pipe, Single End, Horiz., Floor ... C44
12" dia. pipe ... S2
18" dia. pipe, Single End, Horiz., Floor ... C44
18" dia. pipe ... S2

TAPPING AND THREADING MACHINES

(Code number following each listing indicates manufacturer, key on page 82)

Threading Machines

Pipe & Nipple Threading

⅛" to ½" pipe dia. L4
⅛" to ½", Automatic, Nipple L4
¼" to 1¼" pipe dia. L4
¼" to 1½" pipe dia. L4
½" to 1¼" dia. L4
½" to 1½" dia. L4
½" to ¾" pipe, Automatic, Nipple L4
½" to 2" pipe dia. L4
½" to 3" dia. P9
½" to 3" pipe, 16' to 25' lengths L4
½" to 13⅜" O.D. pipe, Pipe handling equip. T5
1", 1¼", 1½", 2" pipe, Automatic, Nipple L4
1" to 3" pipe dia. L4
1" to 5" pipe, 16' to 50' lengths L4
1¼" dia. M39
1¼" dia., Two Spindles M39
1¼" to 4½" P9
2" dia. M39
2" dia., Two Spindles M39
2" dia., Double Head M39
2" pipe dia. S2
2" pipe dia. T12
2" to 4½" pipe S29
2½" to 4" pipe dia. L4
3" pipe dia. S2
4" pipe dia. S2
4" pipe dia. T12
4½" to 7⅝" P9
4½" to 8⅝" pipe S29
5½" to 9⅝" P9
8⅝" to 13⅜" pipe S29
1" spindle cap., Double End, Magazine-Fed C20
2" spindle cap., Double End, Magazine-Fed C20

Bolt & Pipe Threading

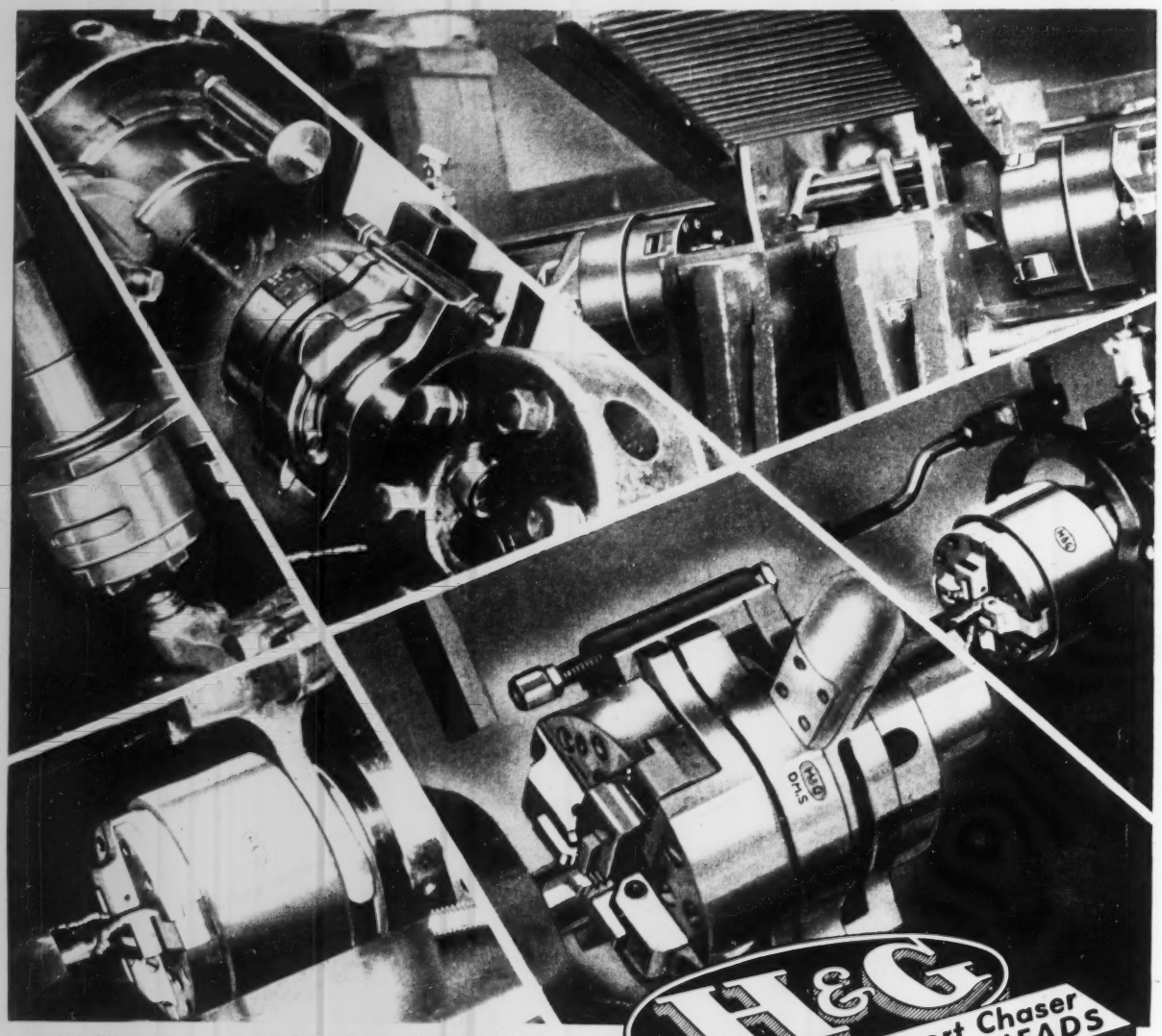
1" dia. cap., Single Head A4
1" dia. cap., Double Head A4
1½" dia. cap., Single Head A4
1½" dia. cap., Double Head A4
2" dia. cap., Single Head A4
2" dia. cap., Double Head A4
2" dia. cap., Single Head B13
2" pipe, 1½" bolt P4
2½" dia. cap., Single Head A4
2½" dia. cap., Double Head A4
3" dia. cap., Single Head A4

Thread Rolling

$\frac{1}{16}$"-1" x 8 pitch S46
$\frac{3}{8}$" dia. x 1" long W10
⅛" to 1½" dia. work N1
⅛" dia. x 3" long W10
.138" to 4" dia., Cylindrical Die, Type W12
$\frac{5}{8}$" dia. x 1½" long W10
$\frac{7}{8}$" cap. N5
$\frac{7}{8}$" dia., Automatic, Horizontal N5
$\frac{7}{8}$" dia. x 4" long W10
#6 to $\frac{5}{16}$" screws H10
#4 to ¼", Planetary Type P26
#2 to #10 screws H10
¼" cap. N5
¼" to ⅝", Planetary Type P26
¼" dia. x 2" long W10
¼" to 2⅝" dia., Cylindrical Die, Horizontal R4
¼" to 2⅝" dia., Cylindrical Die, Vertical R4
$\frac{5}{8}$" dia. x 5" long W10
$\frac{5}{8}$" dia., Automatic, Horizontal N5
⅜" cap. N5
⅜" dia., Automatic, Horizontal N5
⅜" dia. x 3" long W10
⅜" to 3" x 4" pitch S46
$\frac{7}{16}$" dia. x 6" long W10
½" cap. N5
½" dia., Automatic, Horizontal N5
½" dia. x 4" long W10
½" dia. x 6" long W10
$\frac{9}{16}$" dia. screw, ¾" dia. plug, Headless Set Screw and Pipe Plugs E2
⅝" cap. N5
⅝" dia., Automatic, Horizontal N5
⅝" dia. x 4½" long W10
¾" cap. N5
¾" dia., Automatic, Horizontal N5
¾" dia. x 5" long W10
¾" dia. x 6¾" long W10
¾" dia. x 8" long W10
⅞" to 2½" dia., Cylindrical Die, Horizontal R4
1" cap. N5
1" dia., Automatic, Horizontal N5
1" cap., Vertical N5
1" to 4" dia., Cylindrical Die, Horizontal R4
1" dia. x 5" long W10
1" dia. x 6" long W10
1½" work dia., Cylindrical Die Type L14
1½" cap., Vertical N5
6 to ⅛" machine screws, High Speed Threader W10
2" work dia., Cylindrical Die Type L14
3" work dia., Cylindrical Die Type L14
4" work dia., Cylindrical Die Type L14
5" work dia., Cylindrical Die Type L14
6" work dia., Cylindrical Die Type L14
10" work dia., Cylindrical Die Type L14

Tapping & Threading Machines Not Elsewhere Classified

½" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
½" pipe, 2 unit, Tapping Machine, Pipe Fitting P16
½" pipe, 3 unit, Tapping Machine, Pipe Fitting P16
½" pipe, 4 unit, Tapping Machine, Pipe Fitting P16
½" pipe fitting, Tapping Machine, Pipe Fitting P16
¾" pipe fitting, Tapping Machine, Pipe Fitting P16
¾" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
¾" pipe, 2 unit, Tapping Machine, Pipe Fitting P16
¾" pipe, 3 unit, Tapping Machine, Pipe Fitting P16
¾" pipe, 4 unit, Tapping Machine, Pipe Fitting P16
¾" pipe plugs, Threading Machine, Pipe Plug P16
1" pipe fitting, Tapping Machine, Double Ell P16
1" pipe bushings, Tapping Machine, Pipe Bushing P16
1" valve bodies, Reaming & Tapping, 4 station, 6 spindle P16
1" pipe, 1 unit, Tapping Machine, Bushing P16
1" pipe, 2 unit, Tapping Machine, Bushing P16
1¼" pipe fitting, Tapping Machine, Pipe Fitting P16
1¼" pipe, 4 unit, Tapping Machine, Group P16
1¼" pipe, Tapping Machine P16
1¼" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
1¼" pipe, 2 unit, Tapping Machine, Pipe Fitting P16
1¼" pipe, 3 unit, Tapping Machine, Pipe Fitting P16
1¼" pipe, 4 unit, Tapping Machine, Pipe Fitting P16
1¼" union nuts, Reaming & Tapping, Union Nut, 4 spindle P16
2" pipe fittings, Tapping Machine, Pipe Fitting P16
2" pipe bushings, Tapping Machine, Pipe Bushing P16
2" pipe fitting, Tapping Machine, Double Ell P16
2" pipe fittings, Drilling, Reaming & Tapping, 6 station P16
2" pipe plugs, Threading Machine, Pipe Plug P16
2" pipe ends, (valve bodies), Reaming & Tapping, 3 station, 4 spindle P16
2" valve bodies, Reaming & Tapping, 4 station, 6 spindle P16
2" pipe, Tapping Machine P16
2" return bends, Tapping Machine P16
2" pipe, 1 unit, Tapping Machine, Bushing P16
2" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
2" pipe, 2 unit, Tapping Machine, Pipe Fitting P16
2" pipe, 2 unit, Tapping Machine, Bushing P16
2" pipe, 3 unit, Tapping Machine, Pipe Fitting P16
2" pipe, 4 unit, Tapping Machine, Pipe Fitting P16
2" pipe, 4 unit, Tapping Machine, Group P16
2½" union nuts, Reaming & Tapping, Union Nut, 4 spindle P16
4" pipe bushings, Tapping Machine, Pipe Bushing P16
4" pipe plugs, Threading Machine, Pipe Plug P16
4" pipe fitting, Drilling, Reaming & Tapping, 6 station P16
4" pipe, 1 unit, Tapping Machine, Bushing P16
4" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
4" pipe, 2 unit, Tapping Machine, Pipe Fitting P16
4" pipe, 2 unit, Tapping Machine, Bushing P16
4" pipe, 2 unit, Tapping Machine, Flange P16
4" pipe, 3 unit, Tapping Machine, Bushing P16
4" pipe, 3 unit, Tapping Machine, Pipe Fitting P16
6" pipe, 1 unit, Tapping Machine, Bushing P16
6" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
6" pipe, 2 unit, Tapping Machine, Bushing P16
6" pipe, 2 unit, Tapping Machine, Flange P16
8" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
8" pipe, 2 unit, Tapping Machine, Flange P16
12" pipe, 1 unit, Tapping Machine, Pipe Fitting P16
12" pipe, 2 unit, Tapping Machine, Flange P16
16" pipe, 2 unit, Tapping Machine, Flange P16
¼" to ¾" dia., Threading L4
¼" dia. thread, Vertical, Universal Threading P20
½" dia. thread, Vertical, Universal Threading P20
½" to 1" dia., Threading L4
½" dia. rod, 6" long, Automatic, Double End Threading G19
½" to 1½" dia., Staybolt, Floor Threading L4
¾" dia. thread, Vertical, Universal Threading P20
¾" to 2½" dia., Staybolt, Floor Threading L4
¾" dia. rod, 12" long, Automatic, Double End Threading G19
¾" dia. 36" long, Automatic, Double End Threading G19
¾" dia. 40" long, Automatic, Double End Threading G19
2" dia., Special, Burring, Chamfering, Boring, End-Finishing and Threading P8
4" dia., Special, Burring, Chamfering, Boring, End-Finishing and Threading P8
4" swing, 36" cc. Threading L13
4" swing, 60" cc. Threading L13
12" swing, 60" cc. Threading L13
Single Purpose Threading R10
Coupling Reamer and Threader R5



1. Style MM on drill press. 2. Style DM on B & S automatic. 3. Style TM cutting taper threads on double-end threader. 4. Style MM on multi-spindle automatic. 5. Style DMS on turret lathe. 6. Style MM on threading machine.

H&G Insert Chaser DIE HEADS

WHY IS IT? In automatic screw machine departments . . . 4 out of 5 of the die heads ON-THE-JOB seem to be H & G

You'll find other makes on the premises—tucked out of the way on the floor, on a nearby bench, on the foreman's desk, on the second shelf of the tool crib—

But, *on the job, cutting threads*, it is H & G.

Why this preference? What accounts for it?

It could be that producers of threaded parts find H & G more economical for threading by virtue of the low cost of insert chasers.

It could be that set-up men and operators have less trouble, less rejects, less downtime . . . with H & G Die Heads.

It could be the capacity of H & G Die Heads to cut threads to class 3 tolerances—threads straight and true to micrometer dimensions.

It could be the interchangeability of H & G insert chasers, permitting jobs to be shifted from machine to machine, reducing the money tied up in inventory and the space required.

It could be the sum total of all these advantages that make the H & G Die Head—most wanted by operators, working for efficiency; most wanted by management, working for profits.

If you are not enjoying these benefits, maybe you can do something about it. Write for Bulletin: How to Select the Proper Die Head for the Job, and mention make of machines operated.

H & G
THREADING MACHINE

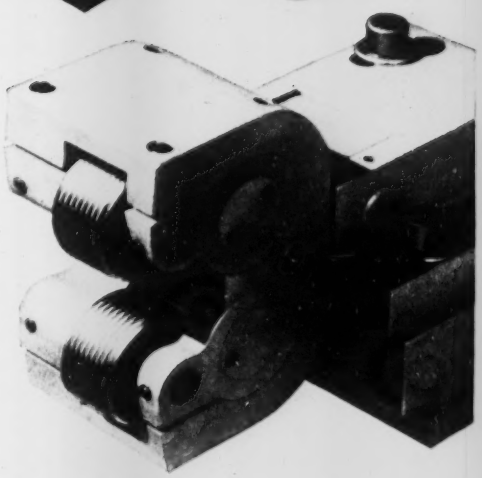
THE EASTERN MACHINE SCREW CORPORATION • 22-42 Barclay Street, New Haven, Conn.

Facts about Thread Rolling It will PAY you to Know . .

Thread Rolling . . . as a Primary Operation

REED

with Reed Thread Rolling Attachments on Screw Machines and Lathes



Reed Thread Rolling Attachments are currently built in four popular standard sizes and designed to operate from the cross slides of automatic screw machines and automatic lathes. Each size is adjustable to accommodate an infinite range of work diameters within its capacity and consists of two units . . . a head and an adapter.

For more than 100 sizes of machines

The heads are of compact rigid design and are assembled to an adapter by a floating swivel connection. Four standard heads make possible the selection of an attachment that will provide the maximum thread rolling capacity within the tooling sectors of more than 100 sizes of single and multiple spindle automatic screw machines.

A large assortment of adapters are available for more than 300 cross slide applications.

Thread Rolling . . . as a Secondary Operation

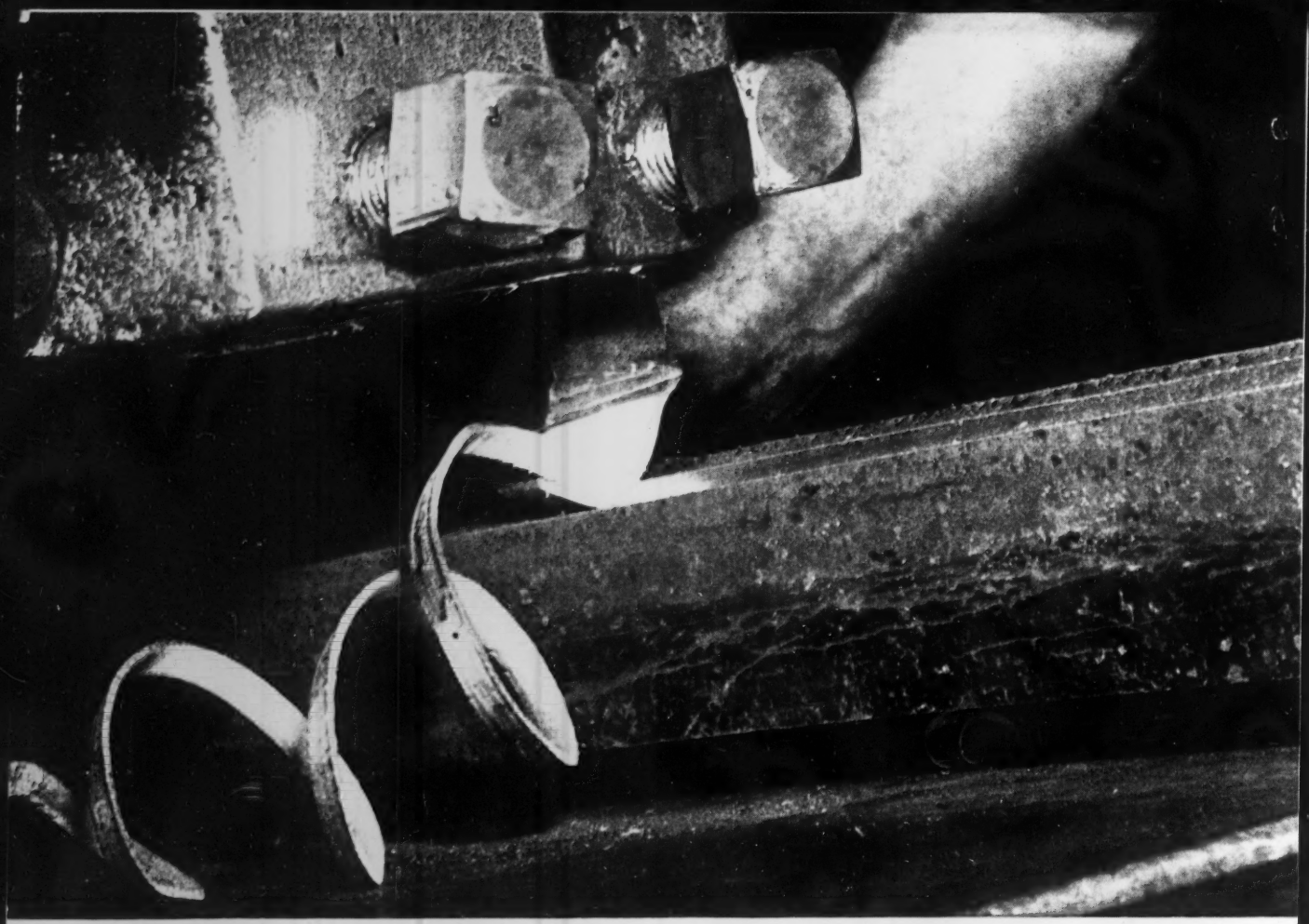
with Reed Cylindrical Die Thread Rolling Machines

Reed Cylindrical Die Thread Rolling machines, using three dies, have made possible interchangeable manufacture of threads on component parts where close tolerances once made selective assembly a costly requirement. Reed machines are easy to set up and simple to operate economically. Their unusual range and flexibility provide for a wide variety of applications. Since standard vertical and horizontal model machines are available, it is possible to select the kind of machine best suited for a specific requirement. Standard machines have various work diameter capacities up to 4 inches.

REED ROLLED THREAD DIE CO.

THREAD ROLLING MACHINES and DIES • KNURLS • THREAD ROLLS
Worcester, Massachusetts, U. S. A.

Sales Offices in: BUFFALO • CHICAGO • CLEVELAND • COMPTON, CALIF. • DETROIT • ENGLEWOOD, N. J. • HOUSTON
INDIANAPOLIS • MILWAUKEE • MONTREAL • NEW YORK CITY • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SYRACUSE • TORONTO



MANUFACTURERS IN THIS SECTION

Ace & Central States Machine Tool Co.—A3
Acme Machinery Div.,
Hill Acme Co.—A4
Acromark—A6
American Broach & Machine Co.
Div. Sundstrand Machine Tool Co.—A13
Baker Brothers Inc.—B2
Baldwin Lima Hamilton Corp.—B4
Barnes Drill Co.—B8
W. F. & John Barnes Co.—B9
Barrett Machine Tool Co.—B11
Bruckner-Kropf Machine Co.—B39
Buhr Machine Tool Co.—B48
Chattanooga Machinery Co.—C6
Consolidated Machine Tool Corp.
Div. Farrel Birmingham Co.—C36
Cross Co.—C49
Davis Keyseater Co.—D4
Davis & Thompson Co.—D5
Delta Tool Div.,
Rockwell Mfg. Co.—D6
Dyknex Corp.—D21
Economy Engineering Co.—E2
Electro-Arc Mfg. Co.—E7
Elox Corp. & Dev. Corp. of Chicago—E11
Enterprise Machine Parts Corp.—E16
Espen-Lucas Machine Works—E17
Fitchburg Engineering Corp.—F7
Foote Burt Co.—F9
Wm. A. Force & Co. Inc.—F11
Frew Machine Co.—F19
Gilman Engineering & Mfg. Corp.—G9
Grant Mfg. & Machine Co.—G19
Greaves Machine Tool Co.—G21
Greenlee Brothers & Co.—G22
Hanson-Whitney Machine Co.—H8
Hoern & Dilts Inc.—H24
Ingersoll Milling Machine Co.—I4
Inter-Lakes Engineering Corp.—I5
Jones & Lamson Machine Co.—J5
Kent Machine Co.—K8
Landis Machine Co.—L4
R. K. Leblond Machine Tool Co.—L10
Lee Engineering Co. Inc.—L12
Leffler Machinery & Die Co. Inc.—L14
Le Maire Tool & Mfg. Co.—L17
Martin Machine Co.—M6
McIlvanie Machine Works—M12
Metalmaster Div.—M19
Miller Glass Engineering Co.—M24
W. K. Millholland Machinery Co.—M26
Mitts & Merrill—M28
Moline Tool Co.—M31
Morris Machine Tool Co.—M35
Motch & Merryweather Machinery Co.—M37
Murchey Div. of Sheffield Corp.—M39
National Automatic Tool Co. Inc.—N2
National Machinery Co.—N5
Noble & Westbrook Mfg. Co.—N13
Numberall Stamp & Tool Co.—N15
Pawtucket Mfg. Co.—P3
Pellow Machine Co.—P5
Peerless Production Co.—P7
Pines Engineering Co. Inc.—P8
Pipe Machinery Co.—P9
Pottstown Machine Co.—P16
Pratt & Whitney Div.,
Niles-Bement-Pond Co.—P17
Reading Machine Co.—R2
Rehnberg-Jacobson Mfg. Co.—R5
George T. Schmidt Inc.—S6
Seneca Falls Machine Co.—S8
Snyder Tool & Engineering Co.—S23
John B. Stevens Co.—S38
Sunray Co.—S42
Sundstrand Machine Tool Co.—S43
Superior Machine & Engineering Co.—S45
Taylor-Wilson Mfg. Co.—T5
Thomas Machine Mfg. Co.—T6
H. P. Townsend Mfg. Co.—T14
Turner Bros. Inc.—T16
United States Electrical Tool Co.—U4
Wadell Equipment Co.—W2
Waterbury Farrel Foundry & Machine Co.—W10

SECTION 12

Machine Tools

Not Elsewhere Classified

Transfer Type, Index Table & Other Automation Machines

3" dia., 40" length, Sawing and Double End Operation M37
4½" dia., 40" length, Sawing and Double End Operation M37
6" dia., 40" length, Sawing and Double End Operation M37
7½ hp max. cap., Milling and Centering 3 Station Rotary Type Automatic M37
15 hp max. cap., Milling and Centering 3 Station Rotary Type, Automatic M37
30 hp max. cap., Milling and Centering 3 Station Rotary Type, Automatic M37
Indexing, 3, 4, 6, 8 Station, Milling, Drilling, & Tapping F7
4 station, Indexing Machine, Horiz. I5
4 to 8 stations, Transfer Milling Machines S23
4 to 12 stations, Transfer Tapping Stations S23
4 to 90 stations, Transfer Drilling Machines S23
6 station, Indexing Machine, Vertical I5
Special, Transfer Type Milling, Boring, Drilling I4
Special-Trunnion and Table, Multiple Head Machines B2
Special, Transfer & Index Table B5
Special, Transfer Machines B5
Special, Transfer Machines B12
Special, Single Purpose B48
Special, Transfer Machines, Multi-Operation F9
Special, Index Table, Milling, Drilling, Tapping, Broaching G9
Special, Multiple Operation, Index & Continuous H24
Special Purpose, Multi-Station, Drilling, Reaming, Boring, Tapping, Facing M35
Special, Multi-Operation, Transfer, Trunnion, Way-Type P7
Special, Transfer & Index Table T16
Special, Boring Machine—single purpose, multiple spindle, multiple station, way, dial, trunnion or transfer type C49
Special, Drilling Machine—multiple spindle, multiple station, way, dial, trunnion or transfer type C49
Special, Milling Machine—multiple spindle, multiple station, way, dial, trunnion or transfer type C49
Special, Tapping Machine—multiple spindle, multiple station, way, dial, trunnion or transfer type C49
Special, Transfer Machine—combination operation, multiple spindle, multiple station, plain or pallet types C49
Special, Metalworking Machinery G22
Special Purpose, Automatic Multi-Operation Machines M26
Special Transfer & Center Column Index Type Machine N2

(Code number following each listing indicates manufacturer, key on page 82)

Other Machine Tools

Pointing, Chamfering & Burring Machines

.164" dia., 1¼" long, Pointing Machine T14
⅛"-⅝", Facing, Chamfering & Reaming Automatic, Pipe P9
.375" dia., 3" long, Pointing Machine T14
⅝" dia. x 3½" long, Pointing Machine, Automatic E2
⅝" dia., 4½" long, Pointing & Threading Machine, Two Spindle, Automatic E2
.562" dia., 6" long, Pointing Machine T14
⅛"-3", Facing, Chamfering & Reaming Automatic, Pipe P9
½" dia. bolt, Pointing Machine, Lag Screw Gimlet N5
⅝" dia., 6" long, Pointing & Threading Machine Comb., Lag Screw Gimlet E2
⅝" dia., Pointing Machine, Bolt K8
¾" dia., 6" long, Pointing Machine, Automatic E2
¾" dia., 6" long, Pointing & Shaving Machine, Automatic E2
⅞" dia. bolt, Pointing Machine, Lag Screw Gimlet N5
⅝" nut, Burring Machine N5
1" max. cap., Drilling & Burring J5
1" dia., 6" long, Chamfering Machine, Double End E2
1" dia., Pointing Machine, Semi-Automatic E2
1" dia., 6" long, Pointing & Threading Machine Comb. E2
1¼" nut, Burring Machine N5
1¼"-4½", Facing, Chamfering & Reaming, Automatic, Pipe P9
2" dia. cap., Chamfering Machine, Pipe Coupling, Semiautomatic A4
2" nut, Burring Machine N5
2" dia., Finishing Machine, End, Tube & Rod P8
2¼" dia., 3" long, Chamfering Machine, Automatic, Double End G19
2¼" dia., 6½" long, Chamfering Machine, Automatic, Double End G19
2¼" dia., 11" long, Chamfering Machine, Automatic, Double End G19
2½" dia., Pointing Machine, Bar K8
2½" x 48" belt, Deburring, Abrasive Belt D6
3" dia., Finishing Machine, End, Tube & Rod P8
4" dia., Finishing Machine, End, Tube & Rod P8
5" dia., Finishing Machine, End, Tube & Rod P8

Keyseating Machines

⅛" wide, 6" long C6
½" wide, 4½" long, Tilting Table Type D4
⅝" wide, 3⅜" long, Bench B2
¾" wide, 6" long M28
¾" wide, 8" long, Tilting Table Type D4
1" wide, 7½" long, Tilting Table Type D4
1" wide, 8¼" long, Tilting Table Type S12
1" wide, 9" long, Overarm Type B2
1¼" wide, 12" long M28
1½" wide, 13" long C6
2" wide, 15" long M28
2" wide, 24" long C6
2" wide, 24" long M28
2¼" wide, 18" long M28
2½" wide, 26" long, Overarm Type B2
3" wide, 24" long M28
3½" wide, 30" long M28
4" wide, 28" long C6
4" wide, 31" long C6
4" wide, 36" long M28
4" wide, 42" long M28
4" wide, 50" long M28
4" wide, 60" long M28
5" wide, 40" long C6
5" wide, 90" long C6
Special, Keyseat Milling C36
Special, Internal M12
Special F7

Metal-Disintegrating Machines

220/440/110V, Tap Extractor E7
220/440V, Tap Extractor, Production E7
Special, Tap Extractors E11
Special, Precision E11
General Purpose, Disintegrating Machine M19

Rifle Working Machines, Rifling

26" swing, 38' bed length L10
30 cal. F9
50 cal. F9
50 cal., 2 spindle F9
6" dia. bore, Horizontal B4
10" dia. bore, Horizontal B4
16" dia. bore, Horizontal B4
A13

Shaving Machines

⅜" dia., 5½" long, Automatic E2
¾" dia., 6" long, Pointing & Shaving Machine, Automatic E2
¾" dia. cap., Shaving Machine, Screw, Single End, Horizontal P3
1" dia., 6" long, Automatic E2
1¼" dia. cap., Shaving Machine, Screw, Single End, Horizontal P3
1½" dia. cap., Shaving Machine, Screw, Single End, Horizontal P3
2" dia. cap., Shaving Machine, Screw, Single End, Horizontal P3

Reaming Machines

⅞"-5⅝" hole, 30" depth, 2-spindle P17
⅞"-5⅝" Hole, 50" Depth, 2-spindle P17
½" to 3" pipe size, 16' to 25' lengths L4
¾" dia. M39
1" pipe fittings, Sweat Fittings, 3-spindle P16
1"-2" Hole, 37" Depth, 2-spindle P17
1"-2" Hole, 60" Depth, 2-spindle P17
1"-2" Hole, 81" Depth, 2-spindle P17
1"-2" Hole, 105" Depth, 2-spindle P17
1"-2" Hole, 129" Depth, 2-spindle P17
1" to 5" pipe size, 16' to 50' lengths L4
1¼" pipe fittings, Sweat Fittings, 3-spindle P16
1½" reamer, Reamer Driver, Motor Driven, Hand Operated G21
2" pipe fittings, Sweat Fittings, 3-spindle P16
½ hp, Bench U4
½ hp, Floor U4
1 hp, Bench U4
1 hp, Floor U4
24" travel, 4-spindle B12
25" travel, 12-spindle B12
Special B9
Special, Valve Guides W2
S23

Screw & Nut Slotting Machines

¼" dia., Slotting Machine, Screw W10
⅜" dia., 1½" long, Slotting Machine, Screw N5
⅜ dia., Slotting Machine, Screw W10
⅝" dia. thread chasers K8
⅛" dia., 3½" long, Slotting Machine, Screw N5
⅝" dia., Slotting Machine, Screw W10
⅝" dia. round P5
⅝" dia., 4" long, Slotting Machine, Screw N5
½" dia. S38
½" dia., Slotting Machine, Screw W10
⅝" dia., 3" cap. slot S45
¾" dia. S38
⅞" hex. across flat P5
1¼" hex. across flat P5
1⅜" dia. round P5
1⅝" dia. round P5
1⅝" hex. across flat P5
2⅜" hex. across flat P5
2½" dia. round P5

Facing Machine, Including Flange Facing

⅜" to 2" nut cap., Nut, Single End P3
2" pipe, Gate Valve Seater P16
2" to 6" valve bodies, Facing Machine, 3 spindle P16
2" to 25" cap., 3-Way Valve Facing B11
4" to 24" dia., Flange Facing B11
6" pipe, Gate Valve Seater P16
6" shell, Shell Base, Horizontal, Automatic F19
6" to 12" valve bodies, Facing Machine, 3 spindle P16
8" dia. work, Column E17
14" dia. work, Column E17
18" sq. cap., Column T6
20" dia. work, Column E17
24" sq. cap., Column T6
27" dia. work, Column E17
29" sq. cap., Column T6
44" long, Double End Facing & Centering S23
Two way, Facing & Tapping S23
Special, Column Facing Machines C36
Any size, Pipe T5
Turning & Facing S23

Centering Machines

½" to 3" dia. M39
2½" dia., 45" long, Milling & Centering D5
3¼" dia., 24" length work H8
3½" dia. work, 24" length work, Milling & Centering Machine, Double End S43
3½" dia., 45" length work, Milling and Centering Machine, Double End, Automatic J5
3½" dia. work, 48" length work, Milling & Centering Machine, Single End S43
3½" dia. work, 48" length work, Milling & Centering Machine, Double End S43
3½" dia., 63" length work, Milling and Centering Machine, Double End, Automatic J5
3½" dia., 81" length work, Milling and Centering Machine, Double End, Automatic J5
3½" dia. work, 84" length work, Milling & Centering Machine, Double End S43
4" dia. work, 24" length work S43
4" dia. work, 48" length work S43
4" dia. work, 72" length work S43
6" shell, Shell, Horizontal F19
6" dia., 18" long, Drilling and Centering Machine, Double End S8
6" dia. work, 24" length work S43
6" dia. work, 36" length work, Milling & Centering Machine, Double End S43
6" dia., 42" long, Drilling and Centering Machine, Double End S8
6" dia. work, 48" length work S43
6" dia. work, 48" length work, Milling & Centering Machine, Double End S43
6" dia., 60" long, Drilling and Centering Machine, Double End S8
6" dia. work, 72" length work S43
6" dia. work, 72" length work, Milling & Centering Machine, Double End S43
6" dia., 90" long, Drilling and Centering Machine, Double End S8
6" dia. work, 96" length work S43
10" max. dia., Horizontal, Single End R5
12" dia., Horizontal Axle, Single Head B4
12" dia., 102" long, Horizontal Axle, Double Head B4
24" swing, 144" long, Double End, Boring & Centering D5
30" max. dia., Horizontal, Single End R5
44" long, Double End Facing & Centering S23
75 mm shell, Shell L17
105 mm shell, Shell L17
155 mm shell, Shell L17
8" shell L17
Horizontal, Double End R5
No. 4 or 5 Morse taper, Drilling & Centering, Movable Column, 1 spindle Horizontal Spindle M31
4 spindle, Milling & Centering D5

Marking Machines, Including Knurling

¼" to 4" flat, ¼" to 6" round S6
¼" to 3" round, flat and hex., Continuous Bar S6
¼" to 4" dia., Marking Machine, Rotating, Cylindrical Die Type F11
1" flat, Marking Machine A6
2" dia. Rod-Tube, Marking Machine A6
2" dia. tapered, Marking Machine A6
2" solid, 10" hollow, Marking Machine A6
2½" dia., Knurling, Cylindrical Die Type L14
3" dia., Marking Machine A6
3" to 15" dia., Flange S6
9" max. dia., Marking Machine A6
15" to 36" dia., Flange S6
8" navy, Shell S6
8" navy, Automatic Shell S6
11" navy, Shell S6
20m to 105mm, Shell S6
105mm, Automatic, shell S6
105mm, Shell S6
¼" to ⅝" letter size, Rotating, Die Type, Automatic N15
4" x 4" platform, Rotating Cylindrical-Die N15
6" to 30" lengths, Scale S6
10 tons, Bench N15
10 tons, 6" throat, Bench N15
Marking Machine, Lever, Fixed Die Type M6
Marking Machine, Hydraulic, Fixed Die Type M6
Rotating Cylindrical-Die Type N15
General and Special Purpose Marking, Graduating and Numbering Machines N13

Others

½" dia., Countersinking Machine, Nut K8
1" dia., Countersinking Machine, Nut K8
2½" dia. max., Tapering machines, bar T5
8" max. dia., 40' max. length, Bar Peeling C36
1 spindle, Blanking Machine, Nut M24
2 spindle, Blanking Machine, Nut M24
Boring, Tapping & Contour Machine S23
6" cap., Die Shaping, Sizing D21
Special Purpose Machine Tools A3
90°, Balanced quartering & Crank Pin turning machines B4
Special Machines B39
Special Machines E16
Special Machine Tools C49
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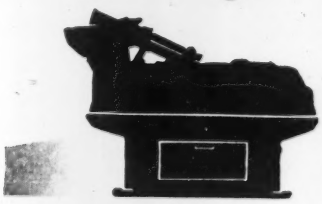

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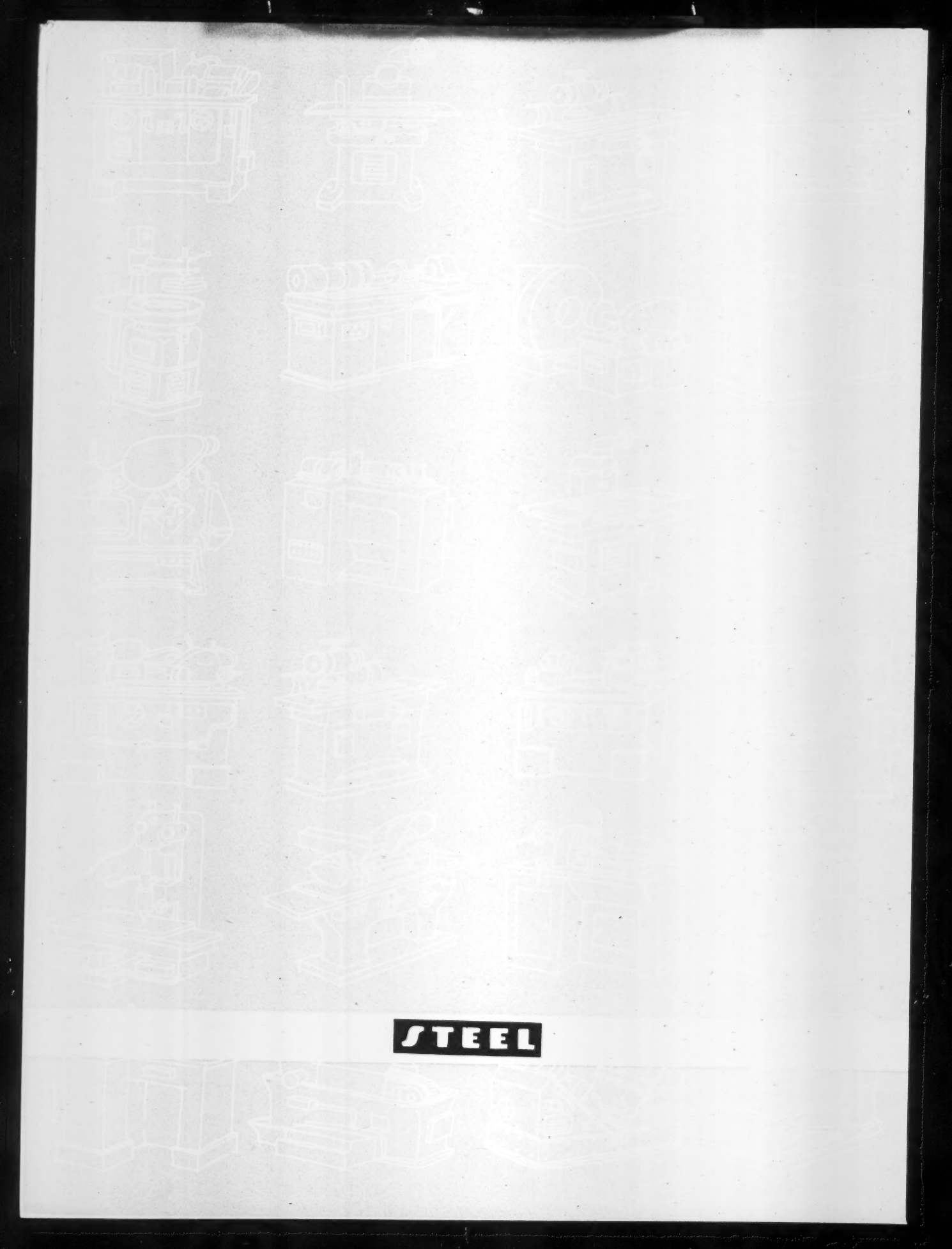
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